

**Investigating the stability of peer friendships amongst preschool children:  
A longitudinal South African study**



**Thesis presented in fulfilment of the requirements for the degree of Masters of Arts  
(Psychology) at Stellenbosch University**

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## **DECLARATION**

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## ABSTRACT

There is robust empirical evidence for the benefits of friendships during childhood, including important mental, emotional and physical advantages (Betts & Stiller, 2013). Many parents of preschool children state that their aim for their children during preschool is to develop meaningful and lasting relationships with their peers (Gainsley, 2013). The present quantitative, two-wave longitudinal social network analysis investigated those factors that predict friendship formation amongst a sample of 59 South African preschool children aged four to six years old, and the extent to which these peer friendships are stable over a nine-month period. Data were collected via individual child-friendly interviews in which a peer nomination questionnaire was completed. Results show that, contrary to previous research, preschool children can reliably distinguish best-friendships from other friendships. Furthermore, boys, children in Afrikaans classes, and children who speak English as a home-language formed the most friendships over time, while girls, children in the older classes (aged five to six years old), and children in English classes became more popular over time. Reciprocal friendships were, as hypothesized, more stable than unidirectional friendships over time. Moreover, 38% of best-friendships were stable over time, compared to only 25% of other friendships that were stable over time. Friendship homophily effects for gender, age and school language were significant predictors of friendship formation, but did not predict friendship stability over time. Finally, despite the unique context of the preschool, where friendships are actively encouraged amongst the entire school population, the results indicate that children in this sample preferred to form friendships with children in the same classroom as them. This research contributes to the relatively sparse literature exploring the predictors of friendship and friendship stability amongst preschool children, both internationally and in the South African context. These findings can inform researchers, practitioners, and teachers and their efforts to design interventions that enhance social skills and promote friendship formation amongst preschool children.

## OPSOMMING

Daar is sterk empiriese bewyse vir die belangrike verstandelike, emosionele en fisiese voordele van vriendskappe tydens kinderjare (Betts & Stiller, 2013). Verskeie ouers van voorskoolse kinders voer aan dat hulle doel vir hul kinders tydens voorskool is om betekenisvolle en blywende verhoudings binne hul portuurgroep te ontwikkel (Gainsley, 2013). Die huidige kwantitatiewe, twee-golf longitudinale sosiale netwerkanalise het ondersoek ingestel na die faktore wat die vorming van vriendskappe onder 'n steekproef van 59 Suid-Afrikaanse voorskoolse kinders tussen vier en ses jaar oud, voorspel asook die mate waartoe hierdie portuurvriendskappe oor 'n tydperk van nege maande stabiel is. Data is ingesamel deur middel van individuele kindervriendelike onderhoude, waarin 'n portuurnominasie vraelys voltooi is. In kontras met vorige navorsing, dui die bevindinge van die huidige studie daarop dat voorskoolse kinders beste-vriendskappe van ander tipe vriendskappe op 'n betroubare wyse kan onderskei. Verder, het dit geblyk dat seuns, kinders in die Afrikaans-medium klasse, en kinders wat Engels as 'n huistaal praat, die meeste vriendskappe oor tyd gevorm het, terwyl meisies, ouer kinders (tussen vyf en ses jaar oud), en kinders in die Engelse-medium klasse, meer gewild geraak het met die verloop van tyd. Wedersydse vriendskappe was, soos gehipotetiseer, meer stabiel oor tyd in vergelyking met eenrigting vriendskappe. Hierbenewens was 38% van beste-vriendskappe stabiel oor tyd in vergelyking met slegs 25% van ander vriendskappe. Vriendskap-homofiliteitseffekte vir geslag, ouderdom en onderrigtaal was beduidende voorspellers vir die vorming van vriendskappe, maar dié faktore het nie die stabiliteit van vriendskappe oor tyd voorspel nie. Laastens, ten spyte van die unieke voorskoolse konteks, waar vriendskappe met kinders binne die hele skool aangemoedig word, dui die bevindinge daarop dat kinders in hierdie steekproef verkies het om vriendskappe te vorm met kinders wat saam met hulle in dieselfde klas is. Hierdie navorsing maak 'n bydrae tot die relatief karige literatuur wat die voorspellers van vriendskappe en vriendskapstabiliteit onder voorskoolse kinders, beide internasionaal sowel as in die Suid-Afrikaanse konteks, verken. Hierdie bevindinge kan navorsers, praktisyns en onderwysers, sowel as hul pogings tot die ontwikkeling van intervensies wat sosiale vaardighede en die vorming van vriendskappe onder voorskoolse kinders bevorder, inlig.

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## **CHAPTER ONE**

### **INTRODUCTION, MOTIVATION AND AIMS OF THE PRESENT STUDY**

Friendships during early childhood (spanning the ages two to six years old; Louw & Louw, 2014) hold numerous benefits for children, including important mental, emotional and physical advantages (Betts & Stiller, 2013; Poulin & Chan, 2010). These friendships offer children more than just having the opportunity to play with similar children; having a friend is a social advantage during early childhood (Sebanc, 2003). During the important developmental stage of early childhood, friendships provide a context for skill development, an opportunity to learn about oneself, others, and the world around them, while also giving children access to emotional and cognitive resources to draw on in times of stress. Finally, friendships during early childhood provide models of behaviour for subsequent relationships (Sebanc, 2003).

The development of friendships amongst preschool children is a complex process that requires rigorous research and further understanding (Niffenegger & Wilier, 1998; Troutman & Fletcher, 2010). Best friends amongst children constitute unique peer relationships that are important for promoting various psychosocial, cognitive, and academic outcomes (Allès-Jardel, Fourdrinier, Roux, & Schneider, 2002; Baumgartner, Burnett, DiCarlo & Buchanan, 2012; Betts & Stiller, 2013; Niffenegger & Wilier, 1998; Poulin & Chan, 2010). The present research investigated the predictors and stability of peer friendships amongst South African pre-schoolers.

This opening chapter provides a general introduction and background to the South African context, setting the backdrop of the socio-developmental context for the present study. It then introduces those putative predictors of friendship formation and stability (maintenance) that were investigated longitudinally in the present study, together with a motivation for the present study. This chapter concludes by briefly outlining the aims and objectives of the research that comprises this thesis, and a broad outline of the thesis as a whole. First, I begin with an overview of the history of intergroup relations in South Africa, which, as I argue below, have a relevant bearing on the nature of peer friendships amongst preschool children living in contemporary South Africa.

## **A Brief Overview of South African Intergroup Relations**

South Africa's history of intergroup relations, spanning over 360 years, is characterised by racial oppression. This history includes forty years of legalised segregation and oppression, a period known as Apartheid. Now, more than 20 years after the end of Apartheid, the country remains plagued by a culture of violence and vast inequalities. In order to understand the unique context that influences the manner in which friendships of young South African children are formed (and maintained), a brief history of South African intergroup relations is provided below.

### **Apartheid (1948-1994)**

Subsequent to being elected to power in 1948, the National Party (NP) systematically formalized and extended the existing racial discrimination and segregation dominating the South African socio-political landscape (Brits, 1994). They called for the formal segregation of South Africa's population groups through laws that were enacted in order to limit the contact amongst different population groups in South Africa (Gibson, 2004).

The first of these laws was the Population Registration Act (1950), which enforced the categorisation of South African citizens into one of four broad population groups<sup>1</sup> (white, black, coloured and Indian/Asian South African). It formed the foundation upon which all further laws prohibiting interactions (or intergroup contact) between white and non-white South Africans, would be based (Attwell, 1986; Louw, 1984). For example, under the Group Areas Act (no. 41 of 1950) different urban spaces were allocated to particular groups, where only those groups were allowed to reside and own property. A year later, in 1951, the Prevention of Illegal Squatting Act, led to the forceful removal of thousands of South Africans from areas reserved for white South Africans (O'Meara, 1996). Contact between white and non-white South Africans was also controlled in general public spaces (Welsh & Spence, 2011) through the Reservation of Separate Amenities Act. The Prohibition of Mixed Marriages Act (no. 55 of 1949) and the Immorality Amendment Act of 1950 outlawed close relationships between white South Africans and black, coloured, and Indian South Africans.

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<sup>1</sup> There remains great sensitivity towards the continued usage of the terms 'white', 'non-white', 'black', 'coloured' and 'Indian' to distinguish between South Africans. As such, these descriptors are used only where necessary, and then in a descriptive manner and within context, as explained throughout the thesis.

Apartheid between population groups in South Africa was also enforced within the education system via the Bantu Education Act (no. 47 of 1953). This Act prohibited white and non-white learners from attending the same schools. Moreover, the early education (including preschool education) of young non-white (i.e., black, coloured and Indian/Asian South Africans) children during Apartheid was largely ignored (Stevens, 1997; UNICEF, 2014). In response to the Bantu Education Act and the lack of early education opportunities for non-white children, non-white women (especially black South African women), who themselves lacked formal education and knowledge, opened ‘preschools’ (called Educare centres) in urban areas, townships and rural homelands (Stevens, 1997). The segregated and disparate education system added to the inferior status of non-white citizens created by Apartheid laws.

The Apartheid legislation, however, was unsuccessful in its attempts at reducing conflict between the various South African population groups. Those citizens who were most affected by the prejudicial laws (e.g., black (African), coloured and Indian South Africans) began to oppose the Apartheid government in various ways (often these lead to violent confrontations between citizens and the State, for example the Sharpeville massacre where 69 non-white protestors were killed by police; Eades, 1999). It is also ironic that during the time that the South African government was enacting legislation to separate population groups, there was growing support within American social psychology that positive intergroup contact could promote positive intergroup relations (Allport, 1954).

During Apartheid, South Africans from the various population groups generally exhibited substantial outgroup prejudice towards one another (Durrheim, Tredoux, Foster & Dixon, 2011; Kinloch, 1985). These findings illustrate that the Apartheid legislation, which attempted to reduce intergroup contact, was unsuccessful in promoting harmonious intergroup relations in South Africa. It was only in 1990 that the burden of international sanctions forced the abolition of Apartheid, and a negotiated settlement ushered in South African’s democracy in 1994.

### **Post-Apartheid (1994 – Present)**

Generally speaking, since the fall of Apartheid, South Africans celebrate the country’s diversity and multicultural heritage. South Africa is one of the most diverse countries in the world in terms of language, race and culture (South African Human Rights Commission & UNICEF, 2011). It has 11 official languages and the population exceeds 55 million people.

According to Statistics South Africa (2015), the country's population comprises of 80.66% black (African)-, 8.12% white, 8.75% coloured- and 2.47% Indian/Asian South Africans, while the population is skewed towards children and young people. Approximately with 39% (over 21 million) of the population under the age of 19, and one third of that (seven million) between the ages of two and six (Statistics South Africa, 2015). Ten percent of these children (i.e., approximately 2.1 million children) reside in the Western Cape (South African Human Rights Commission & UNICEF, 2011).

Today, South Africans can now freely interact with individuals from other groups. Institutions that were formally segregated (including schools at pre-primary, primary, and high school level), are now available to all, allowing for increased contact between different groups of South African citizens. Numerous surveys, however, suggest that while intergroup relations have improved in South Africa since the fall of Apartheid (Institute for Justice and Reconciliation; IJR, 2013), social divisions (including negative outgroup attitudes) and an unwillingness to interact with other groups remain visible amongst the populace (IJR, 2013). As such, in spite of increased opportunities to interact with fellow South Africans of different ethnic backgrounds, it would appear that South Africa remains an informally segregated society (e.g., Chisholm & Nkomo, 2005; Gibson, 2004; Gordon, Roberts & Struwig, 2012).

### **The South African Preschool Context**

Although the Apartheid government aimed to segregate groups within the educational system, learners can attend any educational institution they can gain entry to in the democratic South Africa, based exclusively on educational criteria (although, in reality, many base their choice of educational opportunities on financial constraints). In 1995, non-governmental organizations, with the assistance of international funders (i.e., USAID), began formally training (largely uneducated) Educare teachers in order to improve their ability to provide safe and appropriate learning environments for children (Stevens, 1997). This intervention is important, given that research has shown that the quality of schooling during early childhood (i.e., preschool) has a significant effect on primary school performance (Haddad, 1979; Heyneman & Loxey, 1983; Schiefelbein & Farrell, 1978), especially amongst those who are socio-economically disadvantaged.

South African preschools are funded either by the government (i.e., regulated provincially) or by independent funds (i.e., run by private school bodies or committees). Both



systems are comprised of Pre-Grade R (for children aged zero to four years of age) and Grade R (Reception Year; for children who are five and six years of age). In 2006 there were 31,928 children below the age of five who were enrolled in pre-Grade R classes in South Africa (4,317 of whom were in the Western Cape; SAHRC & UNICEF, 2011). The number of children attending an early developmental educational institution (classified as Grade R, Preschool, nursery school, crèche, Educare centre) varies from 20.80% in Kwa-Zulu Natal to 46.00% in Gauteng Province across the nine provinces of South Africa. According to the 2014 General Household Survey, 35.60% of all children aged six years or younger are attending preschool in the Western Cape (Statistics South Africa, 2015).

Early childhood development should be a top priority in post-Apartheid South Africa because such programs are important for children's mental and emotional development (SAHRC & UNICEF, 2011). Recent research has focused on the content of early childhood education, and has highlighted the emphasis on skills that promote the development of social relationships with peers (see Rekalidou & Petrogiannis, 2012). 'Peers' refer to children of the same age and developmental stage within the literature (Louw & Louw, 2014). Johnson, Ironsmith, Snow and Poteat (2000) found that it might be more important for teachers to encourage the development of social skills during the preschool years as opposed to development of academic skills. The present research is therefore timely, given the current South African research priorities within the preschool context.

### **The Present Study**

The participants involved in the present study are young South African children aged between four and six years old. This developmental period of childhood is often referred to as early childhood, or the preschool period (Louw & Louw, 2014). Early childhood friendships offer children one of the first opportunities to choose who they want to become friends with, distinguishing peer friendships from parental or familial relationships (Louw & Louw, 2014; Poulin & Chan, 2010). Parents of preschool children identify the development of meaningful and lasting relationships with peers as the most important outcome they wish for their child to achieve during preschool (Gainsley, 2013).

Friendships during early childhood are more likely to have an influential role in childhood development if the friendship is considered high in quality and relatively stable over time (Poulin & Chan, 2010). Stable friendships during early childhood are associated with

important mental, emotional, social and physical advantages (Betts & Stiller, 2013; Poulin & Chan, 2010). The stability of an individual relationship or friendship does not occur in a random manner, and is instead dependent on the needs fulfilled by the friendship (e.g., short-term versus long-term needs), as well as inherent individual qualities of the individuals in the relationship (Poulin & Chan, 2010).

Maintaining friendships during early childhood is an important developmental skill for children to master (Allès-Jardel et al., 2002; Baumgartner et al., 2012; Betts & Stiller, 2013; Poulin & Chan, 2010; Proulx & Poulin, 2013; Troutman & Fletcher, 2010). Children who experience difficulties maintaining stable friendships are more likely to experience challenges with psychosocial adjustment (Poulin & Chan, 2010). For this reason, it is imperative to study the stability of early childhood friendships so that teachers, parents and the academic community can establish the factors that predict friendship formation and the essential components of stable friendships during early childhood (Poulin & Chan, 2010). Teachers could use this information in order to structure their classrooms to foster and development important relationships and friendships. Information regarding friendships during early childhood could be of interest to parents trying to make sense and understand their own children's early formative friendships. While this important information will assist academics in understanding friendships amongst preschool children.

Research exploring peer friendships amongst children is dominated by cross-sectional studies relating to these friendships, rather than considering the development of friendships across time (e.g., Cappella, Watling Neal, & Sahu, 2012; Poulin & Chan, 2010). This research has arguably focused on the formation and development of friendships (e.g., Clark & Ladd, 2000; Ladd, 1990; Ladd, Kochenderfer & Coleman, 1996; Sebanc, 2003) without paying much attention to the stability of these peer friendships over time (Proulx & Poulin, 2013).

The present study aimed to address this limitation and to expand on the international literature on peer friendships amongst preschool children in general, and within the South African context in particular. South Africa offers a distinctive context for investigating factors that predict friendship formation and popularity, while also assessing friendship stability. The present study aimed to explore the predictors friendship formation and popularity, while also exploring whether friendship networks in early childhood are characterized as being stable or unstable over a nine-month period amongst a sample of South African preschool children.

Specifically, the present study examined the factors (including similarity, or homophily, and proximity, or propinquity) that predict friendship formation and friendship stability. It also examined whether reciprocal friendships are more stable over time than non-reciprocal friendships amongst children attending a preschool where friendships are encouraged. Moreover, the present study aimed to explore whether friendship quality (i.e., best friends compared to other friends) moderates the stability of friendships over time.

### **Research Problem, Aim, Objective, and Hypotheses of the Present Study**

A review of numerous research databases (including Academic Search Premier, EBSCO Host, Google Scholar, JSTOR, ProQuest, PsycArticles, Public Library of Science (PLOS), ProQuest, SAGE, ScienceDirect, Scopus, Taylor & Francis Journals, Web of Science, and Wiley Online Library) failed to identify any studies investigating friendship networks (nor their stability), amongst preschool children in the South African context. The present study intended to expand the current literature base of friendship networks of preschool children in the South African context.

**Research aim and objective.** The aim of the present two-wave longitudinal social network study was to analyse archival data (wave one baseline data) and follow-up data (wave two) to investigate and explore the factors that predict friendship formation and popularity, as well as the stability of friendship networks, amongst a sample of South African preschool children. The objective was to create two anonymized matrices and social network diagrams from the longitudinal data collected over two waves, in order to analyse and determine the factors that predict friendship formation and the stability amongst pre-schoolers in the South African context.

The methodology of social network analysis (SNA) employs anonymized matrices and social network diagrams to map the social connections (i.e., ties) between groups of individuals (Schneider, Ford, & Perez-Felkner, 2010). SNA aims to identify the dynamic and fluid patterns of friendships (Gifford-Smith & Brownell, 2003). The methodology relies on individuals nominating (i.e., identifying to the researcher) their friendships within a given context, creating a network of outgoing peer nominations (i.e., nominations from each participant to those peers – fellow participants – who they regard as their friend) and incoming nominations (i.e., nominations from peers – fellow participants - to a particular participant).

**Research questions.** The present study explored two broad research questions amongst a sample of South African preschool children:

(1) What factors predict friendship formation (outgoing nominations), popularity (incoming nominations) and friendship stability amongst this sample?; and

(2) To what extent are friendship networks amongst this sample stable or unstable over a nine-month period?

**Research hypotheses.** These two research questions were explored across eight hypotheses, each derived from a thorough reading of the available literature. Three of these hypotheses related to the predictors of friendship formation (hypotheses 1a, 1b and 1c). The remaining five hypotheses (hypotheses 2a – 2e) related to the stability of peer friendships over time. Specifically, amongst this South African sample of preschool children:

**Hypothesis 1a:** Gender, age, and ethnic homophily (similarity) will be significant predictors of friendship formation (e.g., Aboud & Mendelson, 1996; Gifford-Smith & Brownell, 2003; Martin, Fabes, Hanish, & Hollenstein, 2005; McGlothlin & Killen, 2005; McPherson, Smith-Lovin' & Cook, 2001; Rubin, Bukowski, & Parker, 1998; Rubin, Wojslawowicz, Rose-Krasnor, Booth-LaForce & Burgess, 2006);

**Hypothesis 1b:** Classroom propinquity (i.e., being assigned to the same classroom as potential friendship peers) will be a significant predictor of friendship formation (e.g., de Klepper, Sleetbos, van de Bunt & Agneessens, 2010; Gifford-Smith & Brownell, 2003; Troutman & Fletcher, 2010);

**Hypothesis 1c:** The propinquity effect hypothesised in 1b above will be a stronger predictor of friendship formation than the homophily effect hypothesised in 1a above;

**Hypothesis 2a:** Reciprocal friendships will be significantly more stable over time than non-reciprocal friendships;

**Hypothesis 2b:** Friendship quality (i.e., best-friends compared to other friends) will moderate the stability of friendship over time - specifically, best-friend networks will be significantly more stable over time compared to other friend networks;

**Hypothesis 2c:** Homophilous friendships (similarity in terms of gender, age, ethnicity as well as culture and religion) will be significantly more stable over time compared to heterophilous friendships;

**Hypothesis 2d:** Friendships formed between children in the same classroom (i.e., greater propinquity) will be significantly more stable over time compared to cross-classroom friendships; and

**Hypothesis 2e:** The propinquity effect described in hypothesis 2d will have a stronger effect on stability than the homophily effects described in hypothesis 2c.

## **Thesis Outline**

The literature relating to peer friendships amongst children is reviewed in Chapter Two. It describes those developmental factors that influence the development and maintenance of peer friendships in early childhood. Particular attention is given to the discussion of those factors that affect friendship stability.

Chapter Three provides a detailed introduction to the methodology employed in the present study, namely social network analysis. This introduction includes a discussion of the history of the development of this technique, as well as the various approaches available to collecting social network data amongst preschool children. This chapter concludes with a more detailed elaboration of the research design, aims, objectives and hypotheses of the present study, including a description of the participants, the materials used, the data collection procedure and an overview of the data analyses that were undertaken.

Chapter Four provides a detailed presentation of the results. These results include the relevant demographic characteristics of the sample along with six social network diagrams summarising the pattern of social networks identified over the course of both waves of data collection. This chapter concludes with a presentation of the statistics associated with these social networks, and tests of the eight hypotheses associated with the present study.

The results of the present study, along with the contributions made by this research, are discussed in depth in Chapter Five. The chapter concludes with a discussion of some of the shortcomings associated with the present study, and offers suggestions for further avenues of research.

## **Chapter Summary**

Racial oppression has been central to South African history for over 360 years, including 40 years of the Apartheid regime. The laws sanctioned during Apartheid effected

every aspect of daily life for South African people, dictating the classification of people, where people lived, whom they interacted with and where they could be educated. The limitation of contact between whites and non-whites created increased conflict and prejudice, even though international debate on the matter began to consider that intergroup contact may be a very effective means of promoting more positive intergroup relations.

Since the abolishment of Apartheid, significant social advancements have been made, including increased contact opportunities between South Africans of different ethnic backgrounds. However, research has shown that South Africa remains characterised by informal segregation. In the democratic South Africa, white and non-white learners can attend any educational institution they can gain entry to, based on educational criteria and financial considerations. However, levels of attendance of early developmental educational institutions varies greatly across South Africa's nine provinces. It is against this backdrop that the present, two-wave longitudinal social network study examined the factors that predict friendship formation, popularity and stability amongst a South African sample of preschool children aged between four and six years old.

## **CHAPTER TWO**

### **FRIENDSHIP FORMATION AND STABILITY IN EARLY CHILDHOOD**

Human beings are gregarious by nature, and interpersonal friendships form an ubiquitous part of our social life. We are able to develop interpersonal friendships from an early age (Hays, 1985; Maguire & Dunn, 1997). Indeed, the early development of such friendships is associated with numerous correlates of psychological health and adjustment. Studies have consistently shown that children who have friends are generally better adjusted, and have enhanced social skills, when compared with children who do not have friends (e.g., Betts & Stiller, 2013; Fortuin, van Geel, Zibera & Vedder, 2014; Gifford-Smith & Brownell, 2003; Kilma & Repetti, 2008; Poulin & Chan, 2010; Urberg & Kaplan, 1989). Children with friends generally have greater self-esteem, are more sociable, and have a variety of prosocial attributes, (Betts & Stiller, 2013; Cappella et al., 2012; Niffenegger & Wilier, 1998; Witvliet, van Lier, Cuijpers & Koot, 2010). Moreover, children with friends also manage difficult transitions better (such as the transition from preschool to Grade One or changing schools; Gifford-Smith & Brownell, 2003). Children require the necessary skills to successfully maintain dyadic relationships, and they must learn to manage the links between their different friendship groups, known as functional propinquity (Gifford-Smith & Brownell, 2003).

Below I offer a review of the current literature on peer friendships amongst children. I begin with a focus on the developmental aspects that relate to friendships and friendship formation in early childhood. This is followed by considering those individual and contextual factors that might affect the stability of friendships amongst preschool children.

#### **Developmental Aspects of Friendships in Early Childhood**

To understand how preschool children make sense of friendships, it is necessary to review some of those theories that describe normal childhood development (Louw & Louw, 2014; Shaffer, 2002). The theories described below aim to give meaning to the data that were collected. There is no one theory that will be comprehensive enough to cover all facets of human development, and for this reason, I consider different theories that highlight those aspects of child development that are most relevant for the present study.

Caution is warranted when trying to generalize results of friendships studies across different developmental periods (Hays, 1985), because each developmental period is identified by unique characteristics of physical, social, emotional, and cognitive development. The section below, therefore, considers those developmental characteristics relating to the preschool period of childhood (also referred to as early childhood; Louw & Louw, 2014), which usually ranges from age two to age six. During the preschool period of child development, the physical, social, emotional and cognitive development that is initiated during infancy is continued through normal daily experiences (Illingworth, 2013; Louw & Louw, 2014). However, nutrition, biological factors (like genetics), medical issues and environmental challenges can severely influence the growth and development of children (Mash & Wolfe, 2013; Newman & Newman, 2009; Santrock, 2006). Research has shown that factors like genes, parenting styles and the school environment are significant for development during early childhood (Louw & Louw, 2014; Mash & Wolfe, 2013).

### **Physical Development**

The rapid physical development during infancy is somewhat slowed during the preschool period. However, the child's fine and gross motor skills improve considerably during this time. Gross motor skills enable children to experience improved balance and co-ordination, as well as overall enhanced strength. The improvement in the coordination of their hands (fine motor skills) enable preschool children to draw and begin writing. This physical development enables children to play activity-based games with other children, which form the basis of initial friendship formation (Louw & Louw, 2014). Moreover, these activity-based games played with other children offer important opportunities for children to further their social and emotional development, which further enhance the child's ability to develop peer friendships.

Children in the preschool period start to gain an understanding of other people's minds and emotions, and how each person's actions affect one another. This involves both social and cognitive development. The quality of children's relationships is therefore strongly dependent on the child's ability to understand and interact with others (Maguire & Dunn, 1997).

### **Social and Emotional Development**

Johnson and colleagues (2000) reported that the preschool period is a critical period for children's social development. During the preschool period, children tend to move from



playing alone or individually alongside each other to playing with one another in social interactive play-based activities (Gifford-Smith & Brownell, 2003; Martin et al., 2005; Schaefer, Light, Fabes, Hanish & Martin, 2010). This gives rise to play-based friendships. Throughout this period, peer friendships are characterized by positive, coordinated, fantasy-based play in small groups or dyads (Gifford-Smith & Brownell, 2003). Preschool children initiate friendships when they spend time together sharing toys and playing the same games. During play, children learn and are able to practise and hone important skills integral to forming and maintaining peer relationships (Louw & Louw, 2014), including communication and conflict resolution skills. While children are playing, they create the opportunity to model behaviours such as sharing, taking turns, the ability to compromise, and appropriate ways of expressing thoughts and feelings through words and behaviours (Louw & Louw, 2014).

During this developmental stage, socio-dramatic play (or social pretend play) emerges. This is where children act out roles and characters during imaginative play (Louw & Louw, 2014). According to Bandura's social learning theory (1963, 1977), behaviour (including how to make and maintain friendships) is learned from the child's environment through observational learning. Children may mimic behaviours or scenarios from parents, characters on television, teachers or friends (Bandura, 1963). As a result, the way children form and maintain friendships will be influenced by the relationship environment that children are exposed to (Bandura, 1963).

Social and emotional development during the preschool period can also be understood using Erikson's (1963) psychosocial developmental theory. This theory assumes that children develop socially through their ability to adjust to the environment, which is constantly shaped by cultural and social factors within this environment (Erikson, 1963). Erikson (1963, 1968) proposed that, in order to achieve optimal social development, children must successfully resolve the psychosocial crises associated with each of eight stages of psychosocial conflicts throughout childhood. The psychosocial developmental theory developed by Erikson (1963) describes that preschool children in early childhood need to resolve the psychosocial crisis of initiative versus guilt. During this process, children learn to independently explore the world around them whilst realising that their actions have an effect on themselves as well as others (see also Pretorius & Van Niekerk, 2014). During the preschool stage of development, other people (i.e., peers or teachers) become increasingly influential in the social development of pre-schoolers (Louw & Louw, 2014), even though familial relations (i.e., parents and siblings) remain crucial.

## **Cognitive Development**

During the preschool stage, children's knowledge of their physical and social world is constantly growing, and, as a result, their language skills and understanding of the world around them vastly improves (Louw & Louw, 2014). Positive interactions with peers during this stage help preschool children develop self-awareness, effective communication skills and an understanding of how others think and feel (Louw & Louw, 2014).

Piaget (1977) describes the cognitive development of preschool children as being in the preoperational stage. In the preoperational stage, children rely on transductive reasoning, where reasoning from one event is applied to understand another event (Passer et al., 2009). For example, if a child normally sits next to a particular classmate during art activities, and that particular classmate happens to sit somewhere else then the child may think that it is not art class. During the preoperational phase of cognitive development, cognitive operations necessary for logical thinking are not yet formed (see also Louw & Louw, 2014; Passer et al., 2009), although they have the cognitive capacity to represent events and objects mentally and can therefore engage in socio-dramatic play.

Preoperational thought is also characterized by egocentrism, whereby the child views the world from their own perspective while failing to recognize that this view might be different to that of others. This may make preschool children seem selfish (Passer et al., 2009; Piaget, 1977). For example, they find it difficult to answer questions relating to their friend's friends because this involves seeing the world from their friend's perspective. Preschool children's thought processes may also be characterized, amongst others, by the inability to focus on more than one aspect and/or process at a time (known as centration; Passer et al., 2009; Piaget, 1977). Therefore, each question posed to the children in the present research was simple in its wording and dealt with one concept at a time. Finally, preschool children tend to attribute human qualities to inanimate objects (animism; Passer et al., 2009; Piaget, 1977), and it is not uncommon for them to include imaginary friends, animals, or stuffed toys amongst their friends (Louw & Louw, 2014).

## **Comparing the Developmental Aspects of Friendships in Early and Middle Childhood**

The friendships that occur in early and middle childhood differ from one another as a function of the important social and cognitive changes that children undergo in their development towards middle childhood (Gifford-Smith & Brownell, 2003). A key feature of

the social and emotional development in middle childhood is that children in this stage of development are in the industry versus inferiority stage of Erikson's psychosocial theory (Passer et al., 2009). As such, when children enter formal schooling they should have a sense of striving for achievement (Passer et al., 2009). Attending formal schooling also greatly affects social development as children are exposed to new social learning experiences (Louw & Louw, 2014). As a result, children spend less time with their parents and family, and thus children in middle childhood become less dependent upon their parents and develop a more cooperative relationship with their parents (Louw & Louw, 2014), in contrast to the complementary relationship they have with their parents in early childhood.

Peer relationships in middle childhood are also affected by the attendance of formal schooling. Here, children are even more inclined to associate with peers of the same age and gender. This is because they know many more children in these categories as they are in the same classes at school (Louw & Louw, 2014). Peer friendship groups in middle childhood are also generally more cohesive and stable (Louw & Louw, 2014). Friendships in early childhood tend to be play-based friendships while friendships in middle childhood tend to be loyal, faithful and generous (Louw & Louw, 2014). As a result, children become more selective in their choice of friendships during middle childhood, and choose friends based on similarity in age, gender as well as personal characteristics like attitudes and beliefs (Louw & Louw, 2014). Younger children, in contrast, tend to choose friends based predominantly on demographic characteristics (i.e., gender, age, ethnicity, language, religion and culture).

In terms of cognitive development, children in middle childhood can overcome egocentric thought (associated with preoperational thought in early childhood) and are able to see things from others' perspective (Louw & Louw, 2014). They can also solve mental problems and reason using mental operations (Louw & Louw, 2014). These developmental differences notwithstanding, the intrinsic components of friendship (i.e., mutual liking, reciprocity, stability) remain the same across these developmental stages, and are characterised by relatively consistent developmental influences (e.g. Berndt & Perry, 1986; Bigelow, 1977; Buhrmester & Furman, 1987; Furman & Bierman, 1984; Gottman, 1983).

### **Friendship Formation in Early Childhood**

Peer friendships amongst preschool children involve a number of processes, principally the initial formation of friendships and the stability (maintenance) of relationships over time

(Ellis & Zarbatany, 2007; Hoyte, Torr & Degotardi, 2014; Lindsey, 2002; Proulx & Poulin, 2013; Shin, Kim, Goetz, & Vaughn, 2014). Children as young as three or four develop peer relations and are able to establish stable friendships, a phenomenon that has been confirmed by teachers' reports of friendships amongst preschool children (e.g., Martin et al., 2005; Niffenegger & Wilier, 1998; Ogelman & Secer, 2012; Rekalidou & Petrogiannis, 2012; Sebanc, Kearns, Hernandez & Galvin, 2007). In a study on social acceptance, friendships and peer networks in childhood peer relationships, Gifford-Smith and Brownell (2003) found that almost 75% of four year olds across all cultures have been observed to have reciprocal, positive and cooperative relationships (see also Rekalidou & Petrogiannis, 2012). In addition, Sebanc and colleagues (2007) found that preschool children were able to comment accurately on their friendships. During the preschool period friendships create opportunities for attaining mutual enjoyment and coordinated play (Gifford-Smith & Brownell, 2003; Rabaglietti, Vacirca, Zucchetti, & Ciairano, 2012).

Interviews with children have shown that they conceptualize a friend as someone who shares material possessions or pleasurable activities, and has similar expectations to their own (Niffenegger & Wilier, 1998). As children age, their reasons for friendship develop and change, but some friendships endure these changing criteria (Niffenegger & Wilier, 1998). Preschool children tend to define friendships differently to older children in the next developmental stage (i.e., primary school aged children or children in middle childhood; Sebanc et al., 2007; Shin et al., 2014). They define friendship by focusing on who plays with who or who they like as an individual (Shin et al., 2014), whereas older children (i.e., children in middle childhood) will focus on emotional traits such as trust and loyalty (Sebanc et al., 2007). However, Kilma and Repetti (2008) found that even the peer friendships of children younger than four years old were characterized by mutual liking and affection. Furthermore, when asked why preschool children play with each other, pre-schoolers will focus on playing the same game while children in middle childhood will focus on the personal, individual characteristics of the friend (Sebanc et al., 2007).

In order to understand how children in early childhood navigate friendship formation, reference should be made to formative, early relationships. One of the first relationships a child forms is with its parents or primary caregivers. According to Bowlby's (1969, 1988) attachment theory, a secure parent-child relationship helps children to control their own emotions during stressful situations, and to confidently discover their environment and foster their cognitive, emotional and language development (see also Louw & Louw, 2014; Passer et al., 2009).

Furthermore, securely attached children exhibit prosocial behaviours (e.g., empathy and co-operation) that are important for establishing successful peer relations (Bowlby, 1969, 1988). These early relationships with parents/caregivers form a basis for friendship formation throughout development.

Traditionally, relationships with parents, siblings or the wider family tend to be more complementary in nature (where each person has different qualities or skills that complement each other; Proulx & Poulin, 2013; Rekalidou & Petrogiannis, 2012). For example, a parent or family member might facilitate learning and development with a child or help a child through a new environment. In contrast, friendships with peers in early childhood tend to be categorized by reciprocity (i.e., a friendship between two people that is nominated or acknowledged by both parties) and as being voluntary (Proulx & Poulin, 2013).

Unlike relationships with parents, siblings or other family members, the preschool environment allows children to choose whom they would like to play with. This setting, therefore, offers researchers an opportunity to observe the formation and maintenance of peer friendships amongst preschool children (Schaefer et al., 2010). During the transition from home (or informal childcare settings) to preschool (i.e., formal and structured settings), children encounter new demands. These demands include meeting academic requirements and managing relationships with peers as well as teachers (Engel, McElwain & Lasky, 2011). If a child manages to establish quality friendship networks during this time these relationships serve as a buffer for negative or stressful situations (e.g., moving schools/transitioning to new grades, divorce or being a victim of bullying; Engel et al., 2011; Gifford-Smith & Brownell, 2003).

According to Martin and colleagues (2005), preschool children organize themselves into patterns of social organization. Even as children chase each other around the playground, climb up and down the jungle gym and play in pretend ‘worlds’ in the sand pit, there are patterns in the seeming disorganization of children’s behaviour (Martin et al., 2005). Closer examination of the apparent disorganization reveals that some children consistently play together (in a dyad), some play in larger groups, while a few tend to play alone. Competent peer interactions amongst preschool children involve active positive behaviours with peers (i.e., asking others to play and engaging in sharing of toys and thoughts during socio-dramatic play; Howes et al., 2011). This includes complex turn-taking in socio-dramatic games, being able to share the figurative and literal meaning of the games, negotiation of role assignment and narrative content during pretend play, while maintaining a positive tone during the

interaction (Howes et al., 2011; Rekalidou & Petrogiannis, 2012). Children who are able to accomplish all of the above-mentioned components act as leaders in creating games that other children can join (Howes et al., 2011) and are more likely to be nominated as friends. However, the formation of such friendships strongly determined by both individual and contextual factors (Martin et al., 2005; Rekalidou & Petrogiannis, 2012), to which I now turn.

## **Individual Factors**

Numerous individual characteristics influence the formation of peer friendships amongst preschool children (Niffenegger & Wilier, 1998; Rekalidou & Petrogiannis, 2012). These individual characteristics may include the child's ability to (a) exchange information (communicate), (b) engage in common activities (cooperation and/or sharing) with peers, and/or (c) successfully negotiate conflict situations constructively (McPherson et al., 2001; Niffenegger & Wilier, 1998). Arguably, however, the most important individual characteristic that influences friendship formation amongst preschool children is similarity between children (Ellis & Zarbatany, 2007; McGlothlin & Killen, 2005; Poulin & Chan, 2010). Peer similarity can be measured along demographic and social dimensions.

**Demographic similarity.** Similarity along one or more demographic characteristics (e.g., gender, age, ethnicity/culture, language, or religion), activity levels or behaviours, as well as similarity in terms of attitudes and personality characteristics (e.g., aggressive or prosocial tendencies; Curry & Dunbar, 2013; Martin et al., 2005; McPherson et al., 2001) are important determinants of interpersonal attraction amongst preschool children. Similarity promotes relationship quality, cooperation and reinforces friendships (Ellis & Zarbatany, 2007; Poulin & Chan, 2010), as well as a sense of equal status amongst peers, which in turn, promotes social skills, such as compromising, competence and co-operation (Louw & Louw, 2014).

However, the relative importance of some of these variables may vary according to the stage of the friendship formation. Visible demographic traits (e.g., gender) might be relatively more important in the initial friendship formation phase. Less visible demographic traits (e.g., attitudes and personality characteristics) tend to become more salient either after the friendship is formed (during the friendship maintenance phase) or during friendship termination (de Klepper et al., 2010).

The influential role played by similarity in friendship formation is described by the homophily hypothesis, which suggests that, in contrast to the development of peer friendships

as a function of random assignment, there is a distinct bias towards forming friendships with similar others (Curry & Dunbar, 2013; Echols & Graham, 2013; McPherson et al., 2001; Rubin et al., 2006). However, preferences for friends similar to oneself (homophily) are constrained to those individuals available within one's immediate environment (i.e., the principle of propinquity, discussed in detail below).

***Gender.*** Gender homophily is arguably the strongest predictor of friendship formation amongst preschool children (Fishbein & Imai, 1993; Rekalidou & Petrogiannis, 2012; Santos, Daniel, Fernandes & Vaughn, 2015). This is consistent with the literature on gender identity development, which suggests that by the age of three years (36 months) children should be able to label the different genders and draw similarities and differences between genders (Fawcett & Markson, 2010; Martin et al., 2005; McPherson et al., 2001). Martin et al. (2005) also found that more than half of young children's (aged approximately four and a half years old) friendships were same sex friendships, while only one in seven children played exclusively with other-sex peers (see also Martin & Fabes, 2001; Santos et al., 2015). As children age, their tendency to choose a same-sex playmate or friend increases (Urberg & Kaplan, 1989). In integrated settings, where boys and girls can frequently interact, children express a preference for forming same-gender friendships (Urberg & Kaplan, 1989), a preference observed at an earlier age amongst girls than boys (Rekalidou & Petrogiannis, 2012).

***Ethnicity.*** Ethnicity is an especially important social category that children use to compare themselves to other children (Echols & Graham, 2013; Leman et al., 2013; McGlothlin & Killen, 2005). Leman et al. (2013) found that this ethnic preference seems to intensify with age, which may be explained by their increased understanding and awareness of the delicate social implications of group membership. This, in turn, influences cross-group attitudes and friendships (Leman et al., 2013). As such, the preschool setting might offer a unique opportunity to promote cross-group friendships, especially within the present study's heterogeneous preschool setting. This is important, as if the quantity of children's cross-group friendships declines as children age, then children's opportunity for quality cross-group friendships also diminishes. This could negatively impact formative early social cross-group attitudes, which lay the foundations for cross-group attitudes later in life.

***Culture, religion, and language.*** The influence of culture in friendship formation has not received a substantial amount of research attention in the literature (Poulin & Chan, 2010). Culture, religion and language are acquired characteristics (i.e., not necessarily inherent characteristics, but ones that develop over time). The homophily hypothesis, whereby children



tend to interact with others similar to them, is applicable to culture, religion and language as well (Echols & Graham, 2013; McPherson et al., 2001). Children of the same religion are more likely to become friends, but this homophilic bias is not as strong as that associated with gender or ethnicity (McPherson et al., 2001). This could be due to religion manifesting as more of a private characteristic.

In the present study (as a result of the geographic location and the classroom structure) all of the children speak English, Afrikaans or both. However, there are a few children who are able to speak additional languages as a result of their religion and or culture. This can impact friendship formation in the present study. For example, there are children within the present sample who are Libyan and who speak Arabic. The ability to speak Arabic (or an additional language) gives these children an additional similarity or opportunity to create a homophilious friendship. However, in such a case it would be unclear whether the homophilious friendship is due to culture, religion or language.

**Social synchrony.** Although children generally establish friendships with peers who share superficial demographic similarities like gender, age, ethnicity/culture, language or religion, research suggests that children tend to become more similar over time along more complex traits (de Klepper et al., 2010; Gifford-Smith & Brownell, 2003; McPherson et al., 2001). So, while a girl may initially choose to form a friendship with another girl because she looks similar to her, these two girls are likely to become more similar to one another over time with regards to positive characteristics like humour, politeness, sensitivity and style of play, as well as more negative traits like shyness, group acceptance and even depressive symptoms (Gifford-Smith & Brownell, 2003). This process describes what Farmer and Farmer (1996) have identified as social synchrony.

Social synchrony is a group-level process that drives similarity between peers and contributes towards within-group similarity (Farmer & Farmer, 1996; Gifford-Smith & Brownell, 2003). According to social synchrony, the social interactions within peer networks encourage behaviours that function to be either reciprocal or complementary to the behaviour of fellow peers (Cairns, 1979; Farmer & Farmer, 1996). Reciprocal exchanges occur between peers who react to one another in similar ways (e.g., shared behaviours and viewpoints; Cairns, 1979; Farmer & Farmer, 1996) and who consider one another as sharing an equal social status within their peer network. Complementary exchanges (e.g., teaching a peer the rules of a particular game or teaching them a new skill) are interactions where peers do *not* view themselves as equal and, as a result, interact in a distinct manner so that the actions of peers



support each other and are both needed to support the interaction (Cairns, 1979; Farmer & Farmer, 1996). Nevertheless, since complementary exchanges involve peers who influence the behaviours of fellow peers over time, such complimentary exchanges will, over time, promote increased similarity in behaviour and opinions within a peer network (Farmer & Farmer, 1996).

Social synchrony can also be observed when watching children play together in same-sex dyads. As girls play with other girls, they are exposed to, and develop styles of play, that are generally associated with girls (e.g., playing cooperatively in smaller, quieter groups). When boys play with other boys, on the other hand, styles of play emerge that are characterized by forceful, rough-and-tumble play with high activity levels (Gifford-Smith & Brownell, 2003; Martin et al., 2005; Rekalidou & Petrogiannis, 2012; Urberg & Kaplan, 1989). These two, largely different, styles of play create two different social worlds for children's play: one for girls and one for boys (Gifford-Smith & Brownell, 2003; Hanish & Rodkin, 2007; Urberg & Kaplan, 1989). Therefore, if a child wanted to play with an opposite-sex peer, the differing playing styles (brought about by a lack of social synchrony in the styles of play across gender) might create an initial barrier to the friendship formation (Martin et al., 2005).

Homophily and social synchrony need not necessarily be regarded as competing (or exclusive) network phenomena. Individuals are inclined to establish friendships with peers they share similarities with and, as the friendship grows, they will tend to become even more similar to one another in their behaviours and worldviews (Curry & Dunbar, 2013; Farmer & Farmer, 1996; McPherson et al., 2001). Notwithstanding the importance of homophily as a driver of friendship formation amongst preschool children, there are other factors contributing towards friendship formation (this would explain the wide variety of friendships established between preschool children that differ greatly along demographic variables; Schaefer et al., 2010). These other factors relate by-and-large to the contextual factors associated with the preschool child's environment.

### **Contextual Factors**

There are various contextual factors influencing friendship formation amongst preschool children. Chief amongst these are the influential role played in friendship formation by parents (i.e., familial relationships), the physical context of the school, and school staff (i.e., how they negotiate the seating arrangements of the children in the school, a phenomenon

referred to as the ‘invisible hand’; Famer, McAuliffe, & Hamm, 2011, p. 247; see also Van den Berg & Cillessen, 2015).

**Parents and familial relationships.** Parents and families can help foster new friendships amongst young children by arranging shared playtime with other children of the same age, or by creating opportunities for children to play with peers during the early stages of a friendship (Niffenegger & Wilier, 1998; Schneider et al., 2010). Moreover, parents and family members also act as important, positive friendship role models in front of their children, who observe these relationships and acquire a repertoire of ‘friendship behaviours’ through observational learning (Bandura, 1963, 1977).

**The physical characteristics of the school.** For some children, preschool is the first time that they have an opportunity to engage with peers on a day-to-day basis (Louw & Louw, 2014), and this naturally creates opportunities for children to form peer friendships. However, the physical preschool context itself exerts a strong influence on peer friendship formation amongst young children. For example, the size of the classroom can affect friendship formation and friendship maintenance. Cappella and colleagues (2012) found that smaller classrooms are associated with more cohesive social ties, and this may be attributed to greater propinquity between children within smaller classrooms.

The principle of propinquity suggests that children are more likely to associate and become friends with individuals who are available to them (Gifford-Smith & Brownell, 2003). Propinquity involves both physical proximity (i.e., children in the same school or children sitting at the same table) and functional propinquity (i.e., ties through social networks or friends through friends). Both physical proximity and functional propinquity provide opportunities for frequent interactions, and both serve to enhance familiarity amongst peers (Echols & Graham, 2013; Gifford-Smith & Brownell, 2003).

Gifford-Smith and Brownell (2003) explained that the influence of propinquity on friendship formation and maintenance might be even stronger for preschool children who spend most of their time at school in self-contained classrooms, and who rely on parents to organize opportunities for social interactions with other peers. However, for all developmental age groups, homophily (similarity) and propinquity are significant predictors of friendship formation when the school year begins, when children have not yet identified the idiosyncratic attitudes and preferences of their peers (Gifford-Smith & Brownell, 2003).

When the school year begins, the friendship choices of preschool children might be considerably more influenced by homophily and propinquity as these characteristics (i.e., same gender, similar language or ethnicity; homophily) or factors (i.e., being in the same class; propinquity) are easy to identify. At this time of the year, for example, a child might choose to form or maintain a friendship with a similar other (homophily) or someone who is close by (propinquity). Van den Berg and Cillessen (2015) found that propinquity was more considerably related to friendship formation while friendships are developing. However, as the year goes by, preschool children might choose their friends based on factors relating to similarity of attitudes, interests and personality traits (Gifford-Smith & Brownell, 2003).

**School staff.** Preschool children also spend most of their weekdays with their teachers, and so it is unsurprising that preschool teachers have a significant impact on children's social, emotional, cognitive and language development (Du Plessis & Louw, 2008), and friendship formation amongst preschool children. Teachers play a crucial role in deciding the group make-up for classroom activities, who sits with whom during classroom activities, and which children are put into specific classes. These decisions can be very influential in creating opportunities for children to foster and grow newly established relationships within a prosocial environment (Betts & Stiller, 2013; Niffenegger & Wilier, 1998; Van den Berg & Cillessen, 2015). Teachers, therefore, exercise an 'invisible hand' (Farmer, McAuliffe, & Hamm, 2011, p. 247) in determining whom a child interacts with during class time or during structured activities, and this can have an effect on whether any two individuals become friends (Betts & Stiller, 2013). With this 'invisible hand' (Farmer et al., 2011, p. 247), school staff play a significant role in shaping the influence of propinquity on peer friendship formation amongst preschool children.

### **Friendship Stability in Early Childhood**

The formation and the maintenance (stability) of a peer friendship constitute two distinct processes. Nevertheless, there are similar social and behavioural skills that are involved in both forming and maintaining a friendship (Sebanc et al., 2007). Once a friendship is formed, the ability to maintain this friendship can be enhanced based on the opportunity to stay friends (e.g., by seeing each other regularly or attending the same class or school; Niffenegger & Wilier, 1998).

The majority of studies exploring peer friendships amongst pre-schoolers have been largely descriptive, exploring the number of friends a child has and the quality of these friendships (Santos et al., 2015). Moreover, even though friendships take time to develop and are likely to change and evolve with time, the majority of these studies have not considered the influence of time on peer friendships amongst preschool children (e.g., Lee, Howes & Chamberlain, 2007; Poulin & Chan, 2010; Proulx & Poulin, 2013; Rodkin & Ahn, 2009; Troutman & Fletcher, 2010). As such, most of these studies have failed to consider those factors involved in the maintenance (stability) of peer friendships over time<sup>2</sup>. When the role of time on peer friendships amongst preschool children is factored in, then the instability of preschool friendships becomes evident (Betts & Stiller, 2013). Studies have shown varying levels of stability in early childhood friendships largely due to the varying methodologies utilized (Gifford-Smith & Brownell, 2003).

There are two defining features of the stability of peer friendships (Proulx & Poulin, 2013). The first encompasses the existence of peer friendships (or not). For example, a child might have a friend at one time point, which may be dissolved (and therefore absent) at a later point in time. The second feature involves the identity of friends. For example, a child may have a particular friend at one time point but over time the identity of that friend changes. In other words, the original friend that was nominated at wave one is replaced with the nomination of another, different friend at wave two (i.e., while the child still reports having a friend at both time points, the identity of the friend is not that same across the time points; Proulx & Poulin, 2013).

Five different friendship profiles allow researchers to describe the complexity associated with the temporal stability of peer friendships (Proulx & Poulin, 2013). Firstly, the *stable profile* describes the situation where a child maintains their peer friendships with the same peers over time. Secondly, the *fluid profile*, where children lose a friendship with one child and replace this friendship with a friendship with another child over time. Thirdly, the *loss profile* where a child loses a friendship with a child without replacing that friendship with a new one over time. Fourthly, the *gain profile*, where children who started with no friends

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<sup>2</sup> Given the limited number of studies that have investigated friendship stability amongst preschool children (i.e., during early childhood; Santos et al., 2015), some of the studies described in this section relate to research on friendship stability in middle childhood. Nevertheless, the findings from studies in middle childhood may offer important insights for hypothesising the nature of friendship stability in early childhood, by taking the well-established developmental differences between middle and early childhood into account. Where studies relating to middle childhood are cited, only the most relevant findings for the present study are reported and extrapolated to further an understanding of friendship stability in early childhood.

subsequently form one or more friendships over time. Finally, the *friendless profile* where children who had no friends to begin with do not form new friendships over time.

Over short intervals (three to six weeks) between 66% and 100% of middle childhood friendship groups maintain at least 50% of their members (Cairns, Leung, Buchanan, & Cairns, 1995). Research undertaken over longer intervals (i.e., beyond six weeks but all less than one year) found that the proportion of friendships that remained stable over time ranged from 18% to 76% (Gifford-Smith & Brownell, 2003). This variability may largely be due to variations in the methodology (and definitions of ‘stability’; Gifford-Smith & Brownell, 2003) employed across the different studies (a topic discussed in more detail in Chapter Three). Gifford-Smith and Brownell (2003) found that estimates show that only about 50% of close friendships during middle childhood are stable within the school year. The long-term stability of peer friendships over more than one school year is below 10%, and could possibly be explained by the change in classrooms and grade transitions that children go through during middle childhood (Gifford-Smith & Brownell, 2003). When the classroom composition remains identical for more than a year, the friendship stability of school-aged children improves significantly to be similar to the stability observed within a one-year period (Gifford-Smith & Brownell, 2003).

Friendship development and maintenance involve developmentally complex sets of individual behaviours, so it is expected that as children develop, their propensity for stable friendships should increase (Gifford-Smith & Brownell, 2003; Poulin & Chan, 2010). If children in middle childhood only maintain half of their friendships, it suggests that preschool children’s propensity for stable friendships might be lower, and that their friendships would be characterised by significant variability and change over time (Ellis & Zabatany, 2007). This is reflected in the literature, which shows that, although preschool friendships may be stable for short periods (and some may last for as much as a year), these peer friendships during early childhood are generally less stable and less differentiated than those amongst older children (Proulx & Poulin, 2013; Sebanc, 2003; Shin et al., 2014).

### **Factors Influencing Friendship Stability in Early Childhood**

Few studies in the past 20 years have explored friendship stability during early childhood for practical and theoretical reasons (Hoyte et al., 2014; Santos et al., 2015; Sebanc, 2003). On a practical level, some researchers are of the opinion that cognitive limitations may prevent preschool children from answering questions relating to their friendships, and that

relying on parent or teacher reports is not sufficiently accurate to be used for research on preschool friendships (Fujisawa, Kutsukake, & Hasegawa, 2009; Santos et al., 2015). Theorists have argued that friendships appear to be less important during early childhood as compared to middle childhood, in that children during early childhood do not have the level of understanding of what friendship entails relative to children in middle childhood (Sebanc, 2003).

Concerns around these practical and theoretical obstacles are not unanimous amongst researchers however. For example, Johnson et al. (2000) and Sebanc (2003) show that preschool-aged children are not limited by their cognitive development to report on their peer friendships. Moreover, feedback provided by parents suggest that young children express unhappiness and loneliness when their best friends move away, and that friendships are in fact important sources of emotional ties for preschool-aged children (Johnson et al., 2000; Sebanc, 2003). High quality, stable friendships are central for positive developmental outcomes in early childhood (including increased school liking, where children enjoy school more; Dunn, Cutting & Fisher, 2002; Lee et al., 2007), and it is important to understand the factors that contribute to the stability or instability of preschool children's friendship networks over time (Ellis & Zarbatany, 2007; Engle, McElwain, & Lasky, 2011).

While the predictors of friendship stability in early childhood remain unclear (Ellis & Zarbatany, 2007; Troutman & Fletcher, 2010), the factors associated with friendship stability (or instability) amongst preschool children is not random at all. Rather, the stability of peer friendships in early childhood is influenced by individual factors, relationship features, and the characteristics of the child's social context or environment (Poulin & Chan, 2010; Proulx & Poulin, 2013).

**Individual factors.** Since the 1930's the developmental literature has reported that preschool children tend to play with same-sex peers, and that these friendships are stable over time (Lee et al., 2007; Martin et al., 2005; Parten, 1932; Santos et al., 2015). Moreover, these studies have highlighted the importance of physical characteristics in guiding friendship selection amongst preschool children. Physical characteristics relate to the congruence or similarity between the child and their friend along physical dimensions (Ellis & Zarbatany, 2007; Poulin & Chan, 2010).

Physical characteristics such as gender, age, ethnicity, language, culture and religion are important in the initial formation of peer friendships in early childhood (as discussed

earlier), but research suggests that these characteristics are equally important for the maintenance (stability) of peer friendships over time (Ellis & Zarbatany, 2007; Poulin & Chan, 2010). Attraction to others similar to oneself may be an adaptive strategy as friendships between similar individuals offer create opportunities for reciprocated approval along with peer validation for the child's social identity (Gifford-Smith & Brownell, 2003).

**Gender.** There is no difference in the ability of boys and girls to form friendships. However, they do differ in their ability or willingness to maintain such friendships over time, especially during preschool (Ellis & Zarbatany, 2007; Proulx & Poulin, 2013). In a study comparing the stability of social networks across boys and girls, Baines and Blatchford (2009) reported social networks differed with regard to size and structure across gender. They reported that girls tend to have a subset of friends and best friends, while boys tend to regard all their friends as either best friends or simply as peers that they simply play with (but who are not their friends; see also Betts & Stiller, 2013; Poulin & Chan, 2010).

Proulx and Poulin (2013) conducted a study amongst preschool children where they explored whether differences in the stability of preschool children's friendships affects their general social functioning. They predicted that girls would be more likely to experience best-friends, reciprocal friendships and a maintained size of friendship networks, whereas the peer friendships amongst boys are more likely to be characterised by conflict and aggression in their peer friendships, negatively impacting the stability of their peer friendships. Their findings not only corroborated those of Baines and Blatchford (2009), that boys reported larger friendship networks than girls, but also supported their *a priori* predictions; boys were more susceptible to the negative effects of losing a friendship (i.e., appeared to be affected significantly more negatively by the loss of a friend in comparison to girls). However, the larger group of friends within the networks reported by boys appeared to buffer them from these effects to an extent, as compared to girls.

In contrast to these findings, Ellis and Zarbatany (2007) found that girls in middle childhood experienced larger friendship networks than boys in middle childhood. This is in contradiction with characteristics that are normally associated with girls' friendship networks, of intimacy and exclusivity. Therefore, when investigating the stability or volatility of social networks amongst pre-schoolers, gender should not be ignored, as this seems to affect the size of the social network (Betts & Stiller, 2013; Proulx & Poulin, 2013).



**Age.** As discussed earlier in this chapter, children of similar ages are more likely to form and maintain friendships with one another – as a function of age homophily. Of course, children of the same age are also more likely to be in the same class or grade, which, through the process of propinquity, also promotes friendship development. The tendency for age homophily tends to decrease as children move to later grades (McPherson et al., 2001), with the impact of propinquity (as opposed to age homophily) then becoming more important in predicting friendship formation.

Age not only affects friendship stability in terms of similarity, it also impacts friendship stability developmentally (Poulin & Chan, 2010). Poulin and Chan (2010) found that as children age, their propensity for friendship stability increases (Poulin & Chan, 2010). In early childhood, around half of children's friendships are stable within a one-year period. However, when those children enter middle childhood, three-quarters of friendships are stable over a one-year period (Poulin & Chan, 2010). This could be due to children's ever-increasing propensity for enhanced friendship stability as they age (McPherson et al., 2001; Poulin & Chan, 2010). Another explanation for this effect could be that children are more likely to stay in the same school and/or class as they get older and schooling becomes more formalized.

**Relationship features.** There are two contributors to the stability of peer friendships in early childhood. These include the quality of the friendship relationship and perceptions of friendship reciprocity.

**Quality of the relationship.** Friends differ from best friends in that best friends seem to offer more psychological 'benefits' (Betts & Stiller, 2013; McChristian, Ray, Tidwell & Lebello, 2012; Quinn & Hennessy, 2010). High quality friendships are generally dominated by the presence of positive characteristics (e.g., intimacy, support and prosocial behaviour) and the relative absence of more negative characteristics (e.g., conflict, rivalry and dominance), as well as being considered more important for the individual (e.g., Betts & Stiller, 2013; Ellis & Zarbatany, 2007; Engle et al., 2011; Poulin & Chan, 2010; Proulx & Poulin, 2013; Sebanc et al., 2007; Troutman & Fletcher, 2010). Betts and Stiller (2013) found that reciprocal best friends are vital for psychosocial development and buffering against the negative effects of bullying (see also Sebanc et al., 2007).

High quality friendships (i.e., best friends) tend to be more stable over time (see Betts & Stiller, 2013; McChristian et al., 2012; Sebanc et al., 2007). However, McChristian and colleagues (2012) found that regular friendships were more stable than best friendships because



of the high intensity and volatility associated with best friendships. McChristian et al. (2012) proposed that the characteristics that set best friends apart from other friends, including mutual dependency, high intimacy and enhanced shared knowledge, could be the characteristics that make the best friend relationships volatile or less stable over time.

Even though young children in preschool define friendship differently from older children in middle childhood, they are nevertheless able to differentiate between best friends and other friends (Quinn & Hennessy, 2010; Sebanc et al., 2007). For example, children as young as three have demonstrated more complex play and more social interactions while playing with a best friend as compared to when playing with other friends (Quinn & Hennessy, 2010). Furthermore, Sebanc et al. (2007) found that friendships between best friends amongst preschool children lasted longer (on average 25.5 months) than any other friendships (on average 15.4 months) amongst preschool children. Of particular relevance to the present study, most of the existing research examining friendships among children either tend to look at best friendships (while ignoring other friendships) or they treat all friendship (best friends and other friends) as the same (Laghi et al., 2014). The present study distinguished between best friends and other friends in the data that were collected.

***Perceptions of reciprocity.*** The second relationship feature that influences friendship stability relates to whether the friendship is perceived as being reciprocal or not (Proulx & Poulin, 2013). Friendship reciprocity describes responding in kind to the indications of friendship received from others (Schaefer et al., 2010). The coordination of behaviour between individuals contributes significantly to the stability of all types of relationships. Preschool children do have the capacity for reciprocity (Proulx & Poulin, 2013; Quinn & Hennessy, 2010; Schaefer et al., 2010). For example, research has shown that four-year old children report at least one reciprocal friendship (see Howes, 1990; Howes, Rubin, Ross, & French, 1988 for classroom observations of children aged one to six years old).

Reciprocal friendships are associated with enhanced positive engagement and stability compared to non-reciprocal (unilaterally nominated) friendships (where a child nominates a particular child as a friend, but that particular child does not return the friendship nomination; Laghi et al., 2014; Lee et al., 2007; Sebanc et al., 2007). Moreover, friendships that are reciprocal are perceived to be of a higher quality, and are subsequently maintained over a longer period of time (Proulx & Poulin, 2013).

Quinn and Hennessy (2010) examined the stability of reciprocal friendships amongst preschool children and found that between 50% and 80% of the reciprocal friendships were maintained from one school year to the next, while 10% of those reciprocal friendships were maintained over a two-year period. However, when friends remained in the same class or even the same school over time, a larger number of reciprocal friendships were likely to last for two years (Quinn & Hennessy, 2010). Schaefer and colleagues (2010) found that friendship reciprocity tends to peak when school year begins. Then, over the course of the school year, children become more selective and start to develop less frequent but more meaningful friendships. However, other studies have found reciprocity to remain constant across the school year (Gifford-Smith & Brownell, 2003; Hoyte et al., 2014), while some have found that friendship reciprocity increases as the school year goes on (Schaefer et al., 2010). Clearly further research is required to understand the nature of friendship stability in early childhood, something the present study aimed to achieve.

**Social context or environmental factors.** The social and environmental context in which a friendship is formed is also important for the stability of the friendship (Poulin & Chan, 2010). As discussed earlier in the chapter, children's parents and the home environment, as well as teachers and the school environment, each facilitate friendship development. They are also central in enhancing friendship stability.

***Parents and the home environment.*** The parental and home environment factors that were previously identified as being important for the initial development of friendships amongst children are similarly important for the maintenance of peer friendships amongst children. Parents can promote the stability of peer friendships in early childhood by creating regular opportunities for their child to engage in shared playtime with their friend, especially during the early stages of the friendship (Niffenegger & Wilier, 1998; Schneider et al., 2010). This could include, for example, inviting peers over to the house to play or for birthday parties.

***Teachers and the school environment.*** Friendship maintenance can also be promoted in the school context (Cappella et al., 2012). School classrooms could be an especially important social context for supporting the stability of friendships; this is where children spend most of their day, exposed to a diverse array of peers (Betts & Stiller, 2013; McGlothlin & Killen, 2005; Poulx & Poulin, 2013). The manner in which teachers structure and manage classrooms can have a significant effect on children's academic and social development (Betts & Stiller, 2013; Van den Berg & Cillessen, 2015).

Specifically, the way teachers manipulate the classroom setting and group children during classroom activities (i.e., the invisible hand; (Farmer et al., 2011) influences friendship stability (Hallinan & Tuma, 1978). Teachers frequently reorganize the seating patterns of the classroom, whether it is to accommodate a different activity, to encourage newly formed relationships (i.e., to encourage friendship stability) or to intervene in a destructive relationship (Hallinan & Tuma, 1978; Van den Berg & Cillessen, 2015). While the propinquity of potential friends in a child's classroom significantly influences friendship development, the propinquity of established friends significantly influences friendship maintenance over time (Gifford-Smith & Brownell, 2003).

In order to capture the effect of propinquity on friendship development and friendship stability, it is necessary to constrain friendship nominations to singular contexts (e.g., a school context), as has been done in numerous previous studies (e.g., Baines & Blatchford, 2009; Poulin & Chan, 2010; Proulx & Poulin, 2013; Rodkin & Ahn, 2009; Troutman & Fletcher, 2010; Wölfer, Faber, & Hewstone, 2015). The influence of propinquity on peer friendships is so strong (indeed, some research suggests it is stronger than the effect of homophily; Echols & Graham, 2013), that when friendship nominations are not constrained to one context (i.e., the classroom/school), children will still mostly nominate children with whom they come into more regular contact with (Gifford-Smith & Brownell, 2003). This methodological consideration is further elaborated on in the following chapter.

### **Chapter Summary**

Physical and cognitive development during early childhood affects children's ability to understand and engage in play-based friendships. Moreover, certain individual and contextual factors play an important role in determining whom children choose to be their friends. To this end, the tendency to form friendships with similar others (described by the homophily hypothesis) is prevalent in early childhood. A second powerful determinant of friendship formation is that of propinquity; children are more likely to associate and become friends with individuals who are available to them in their context. Homophily and propinquity are also strong predictors of friendship stability over time – a dimension of peer friendships in early childhood that is relatively under-represented in the literature. Research suggests that propinquity may exert a stronger influence on friendship stability than homophily. In the following chapter I briefly and describe how social network analysis can be utilised for

studying friendship stability amongst preschool children, and provide a detailed description of the research that comprises this thesis.

## **CHAPTER THREE**

### **STUDYING FRIENDSHIPS USING SOCIAL NETWORK ANALYSIS: A METHODOLOGICAL OVERVIEW OF THE PRESENT STUDY**

#### **Background and History of Social Network Analysis**

Relationships and friendships are an important feature of the human experience (Cappella et al., 2012). Research on friendship formation was undertaken as early as the 1920's when social scientists began examining and exploring group formation (i.e., why people come together and form a group that includes friendships; e.g., Bott, 1928; Hubbard, 1929; Wellman, 1929). Dyadic friendships do not exist in a vacuum, but form part of a much more complex network of interrelationships. While a substantial body of research has been conducted on examining children's dyadic friendships (e.g., Bukowski, Newcomb, & Hartup, 1996; Hartup, 1976), there are only a few studies that have attempted to understand how these friendship dyads are embedded within the child's broader social network (e.g., Gest, Graham-Bermann, & Hartup, 2001; Gifford-Smith & Brownell, 2003; Lansford & Parker, 1999). As such, relatively little is known about how friendships and relationships are formed and maintained in early childhood (see Betts & Stiller, 2013; Hays, 1985; Schaefer et al., 2010; Wölfer et al., 2015).

This is arguably the result of the methodological and analytical complexity of undertaking studies capable of doing so. The complexities associated with the development and maintenance of friendships make them especially challenging to study. In spite of the methodological limitations of the early research on peer friendships, this research nevertheless identified that (a) one should study friendships over time (and not use one-off 'snapshots') and (b) that homophily plays a strong role in stimulating friendship formation. The work of Moreno (1934) argues that group relations are fluid and dynamic, and cannot be adequately understood by looking at a snapshot (or a cross-section) of existing relationships (cited in Snijders, van de Bunt & Steglich, 2010). Rather, one should consider relationships over time and accept that individuals and groups are constantly changing (Gifford-Smith & Brownell, 2003). In this early work (e.g., Bott, 1928; Hubbard, 1929; Wellman, 1929) researchers observed that demographic similarity was an important predictor of friendship formation amongst school children (see also McPherson et al., 2001). For example, Lazarsfeld and Merton's (1954) work on friendship

processes (and similarity) emphasises the influence of homophily in friendship development with their reference to the English idiom that birds of a feather flock together.

Technological advances over the past 50 years have allowed researchers to explore the dynamics of dyadic friendship within the context of the broader social environment in which they occur (Gifford-Smith & Brownell, 2003; Santos et al., 2015). In the last ten years there have been dramatic methodological advances using a social network analysis framework that now make it possible to examine thousands of connections within a single network and how they develop and change (Schneider et al., 2010; Snijders et al., 2010; Wölfer et al., 2015). These advances have also allowed researchers to disentangle peer selection and group processes, and how these account for individual changes in attitudes and behaviours over time (Santos et al., 2015; Wölfer et al., 2015). Today, the analyses that took Delitsch (1900) 20 years to complete can now be completed in a few seconds today (Wölfer et al., 2015). In spite of these advances, research on peer friendships in early childhood (and how they relate to the child's broader social network) remains scarce. Most studies have either focused on school-aged children and adolescents (e.g. Johnson, Ironsmith & Poteat, 1994; Santos et al., 2015; Schaefer et al., 2010; Strayer & Santos, 1996), or not taken the child's broader social network into account. Addressing this particular shortcoming in the existing literature was one of the aims of the present study.

## **The Fundamentals of Social Network Analysis**

Schneider et al. (2010) define a social network as the social ties that connect individuals. Social network analyses allow the complexities of friendships and relationships to be examined and studied (Schneider et al., 2010). Social network analysis assumes that all individuals and their actions are inter-dependant; in other words, that all actions and behaviours of individual actors in a group exert an influence on other individuals within the group (Schneider et al., 2010).

Social network analysis identifies the social relationships between individuals through existing interdependencies (e.g., friendships) and operates with the underlying assumption that these interdependencies say something meaningful about the members that occupy the social being studied (Borgatti, Mehra, Brass & Labianca, 2009). With social network analyses the aim is to identify the dynamic and fluid characteristics of peer relationships (Gifford-Smith &

Brownell, 2003). These analyses are undertaken at the individual- as well as the group-level (i.e., the social network as a whole).

The *stochastic actor-based model* (Snijders, 2001) is an influential approach to studying social networks over time (Wölfer et al., 2015). According to Wölfer et al. (2015), there are four assumptions to this approach and the interpretation of the results (i.e., estimates; Snijders, 2001). These assumptions explain the network dynamics and the evaluation function estimates (statistics that identify the predictors of creating or maintaining network ties; Wölfer et al., 2015). Wölfer et al. (2015) describe these assumptions as follows:

First, the network change in the stochastic actor-based model is based on a[n]... assumption [that] ... the future network state can be predicted solely as a function of the current network state. Second, changes in the network are made by the network members. This is considered to be a purposeful process, in which individuals strive to maximize their satisfaction with the local network neighbourhood... [therefore] the actor based network change is explainable by the attributes and network positions of individuals. Third, the network change takes place continuously between two measurement points...[and] the gradual change can be decomposed into smallest possible units of analysis...[representing] a network member's opportunity to establish, dissolve, or maintain a (non-)relationship. Finally, [these changes] never happen simultaneously, but constitute a sequence of chronological elements that allow one network member at a time no more than one opportunity for a tie change. For example, two unconnected network members A and B are not assumed to suddenly become reciprocal friends, but to develop a mutual friendship connection in temporarily successive steps starting with a unidirectional link ( $A \rightarrow B$ ) followed by the reciprocal link ( $A \leftrightarrow B$ ; Wölfer et al., 2015, p. 54).

### **Approaches to Collecting Social Network Data amongst Preschool Children**

Research into the formation of social networks is complicated by the fact that situations that occur naturally, where the emergence of new relationships can be readily observed, are difficult to access and cannot be easily engineered in a laboratory setting (Hays, 1985; Schaefer et al., 2010). Extensive social psychological research has studied the factors that predict initial dyadic attraction, but very little research has focused on the factors that underpin the maintenance and evolution of these early friendships (Hays, 1985). Preschools offer a natural

‘laboratory’, with clear network boundaries, for studying the emergence, formation, and maintenance of peer friendships.

A preschool setting provides children with a natural space where, for the first time, they have regular contact with a large number of peers. This regular interaction facilitates the development of friendships (Cappella et al., 2012; Martin et al., 2005; Schaefer et al., 2010). Preschools emphasize learning through organized play activities, where children spend much of their time in unstructured activities that provide a basis for social interaction with peers (Martin et al., 2005). Preschool is also a time where, developmentally, children start to play alongside each other and engage in more socially interactive play rather than playing alone (Louw & Louw, 2014; Martin et al., 2005; Schaefer et al., 2010).

The social networks of preschool children tend to involve individuals from families, peer groups, schools, neighbourhoods or communities (Schneider et al., 2010). From a social network perspective, young children sort themselves into non-random peer networks, where friends are chosen according to those peers available and those peers who seem similar to them (Gifford-Smith & Brownell, 2003). Researchers interested in studying the social networks of children are inclined to focus on the formation of friendships in various social locations and the impact that this has on academic achievement and social development (Schneider et al., 2010). For example, Schaefer and colleagues (2010) found that during the preschool period, children’s close friendships (i.e., best friends) become comparatively more stable when compared to toddlers friendships, and their social networks tend to become more organized, more reciprocal, larger and of greater density (Schaefer et al., 2010).

Measuring friendships amongst children within a social network is a challenging task, requiring advanced statistical procedures (Gifford-Smith & Brownell, 2003). In addition, there is no single accepted approach for assessing friendship networks in general, let alone amongst preschool children. The variation in methodology and operational definitions of key concepts (i.e., friendship) have important implications for how the results are interpreted (Gifford-Smith & Brownell, 2003).

**Approaches to collecting data on friendship stability.** Most social networks are fluid systems, and one snapshot (i.e., cross sectional research) may not adequately illustrate the change of these networks over time, for which longitudinal social network data is needed (Wölfer et al., 2015). As previously stated, the fluidity of children’s friendship is a neglected area within the literature, even though the nature of all relationships is that they change and



adapt to meet the current needs of the individuals involved (Poulin & Chan, 2010). Information on the stability of social networks can be collected in a number of ways. The two most frequently used approaches to studying the stability of social networks are the top-down and bottom-up approaches. Only the top-down approach employed in the present study is described in detail below (for a description of the bottom-up approach, which makes use of *in situ* observations of peer interactions, see Baines & Blatchford, 2009; Schneider et al., 2010).

The top-down method (Baines & Blatchford, 2009) is the most commonly used method for studying the stability of social networks (e.g., Baines & Blatchford, 2009; Betts & Stiller, 2013; Proulx & Poulin, 2013; Rodkin & Ahn, 2009) – Schneider et al. (2010) define this method as the formal network approach. This approach makes use of self-report or peer nomination procedures, where participants name those individuals that fall within the relevant social network boundary whom they are friends with (nomination categories can be any friend, best friend, and other friends; Poulin & Chan, 2010; Proulx & Poulin, 2013; Schneider et al., 2010).

These peer nomination methodologies have been found to be a reliable and valid way to identify friendships, as well as the subsequent stability of these friendships over time (e.g., Brendgen, Vitaro, Bukowski, Doyle & Markiewicz, 2001; Vaughn, Colvin, Azria, Caya, & Krzysik, 2001; see also Proulx & Poulin, 2013). However, since the top-down method relies on a participant's self-report on their friendships, it may suffer the limitation (common to self-report data in general) that participants are biased towards reporting on the positive aspects of a friendship, while neglecting to report the negative effects (Rodkin & Ahn, 2009). Therefore, individuals who are unpopular, aggressive or victimized could be disproportionately excluded from friendship networks (Rodkin & Ahn, 2009). Moreover, a further limitation of the top-down approach where participants self-report on their friendships within a given social network, is that participants may be limited by the researcher in terms of the number of friends they are allowed to identify (e.g., Poulin & Chan, 2010, Sebanc et al., 2007; See also Berndt, 1986; Degirmencioglu, Urberg, Tolson, & Richard, 1998; Rubin et al., 1998). This may underestimate the number of friends and the stability of relationships (Poulin & Chan, 2010).

The present study aimed to mitigate these potential limitations in two ways. Firstly, the present study focused on the positive aspects of friendship and did not probe children to give information on any negative relationships within the network. Moreover, Gifford-Smith and Brownell (2003) argue in support of gaining information relating to the child's own insights concerning their peer friendship networks, even if children may exhibit bias in self-reports of

these friendships measures (i.e., peer nominations). They argue that the child's perspective arguably offers the best measure of friendships as the children's own observations of the bonds they share between them give rise to a view that no one else (e.g., parents or teachers) shares. Secondly, preschool children in the present study could nominate as many best friends and other friends as they wanted during the course of the data collection interviews.

***Methodological considerations.*** Various methodological factors affect the information gathered on friendship nominations and friendship stability. Two of the most important methodological considerations relate to the operational definition assigned to the construct of friendship, and the timing, and timing intervals, of data collection.

Firstly, the manner in which peer friendships are operationalized will affect the friendships that can be measured. There are two main categories of friendship definitions (Poulin & Chan, 2010). The first definition of friendship is characterised by reciprocity, where the friendship is valid in the data only if both participants acknowledge the friendship (i.e., the nominator and the nominee are in agreement that this friendship between them exists; Poulin & Chan, 2010). The reciprocal definition of friendship does not allow for the study of friendship outside of the context (social network boundaries) defined by the study (e.g., if a child nominates a peer outside of the preschool – a peer who is unable to corroborate the validity of this friendship nomination). The prerequisite of reciprocal friendship nominations may lead to the underestimation of friendship stability (Gifford-Smith & Brownell, 2003; Poulin & Chan, 2010), because this approach excludes unidirectional friendships in the data (i.e., only recognized or nominated by one participant) from the analysis.

The second category of friendship definition involves the subjective nature of friendships. Here, a friendship is recognised irrespective of whether it is perceived to be important by either of the participants, and regardless of whether it is reciprocal or not (i.e., in this definition, unidirectional friendships are regarded as legitimate friendship in the data; Gifford-Smith & Brownell, 2003; Poulin & Chan, 2010). When subjective definition criteria are used, researchers have found higher peer friendship stability among children, as opposed to moderate stability when defining peer friendships by the nature of their reciprocity (Poulin & Chan, 2010). The present study operationalized peer friendships using the subjective definition of friendships. This approach is grounded on the idea supported by Gifford-Smith and Brownell (2003) that if a child nominates a friendship, then it means it was meaningful to the child, and therefore meaningful to the present study.

The second methodological consideration that can influence friendship stability is the timing and timing intervals of the data collection, which can have a profound impact on measuring the stability of peer friendships amongst children (Poulin & Chan, 2010; Van den Berg & Cillessen, 2015). The timing of data collection has the potential to over- or understate the friendships observed in the friendship network. The beginning of the school year seems to be characterized by positive interactions and enhanced popularity (Van den Berg & Cillessen, 2015). Moreover, van den Berg and Cillessen (2015) found that timing is important when considering popularity, as popularity could be a measure of status rather than individual inclination, and therefore might be overestimated at the beginning of the school year. Furthermore, after the longer summer vacation friendships seem to be entrenched and more difficult to influence through a change in seating arrangement or classroom structure (Van den Berg & Cillessen, 2015). As friendships are simply being noted and analysed (not influenced through a seating arrangement or classroom structure intervention) in the present study, this should not have an effect on the data collected and the results reported below.

Timing intervals can also influence the conclusions drawn about the stability of peer friendships. Information on friendships can be collected in one data collection wave, but in order to evaluate the stability of friendships two or more data collection waves must be completed (Poulin & Chan, 2010). In order to evaluate friendship stability at least two waves of data collection are necessary to analyse friendship stability over time. If only one wave of data were collected there would be nothing with which to compare the friendship network in order to study the stability. Most studies have found that two waves will suffice (e.g., Aboud, Mendelson & Purdy, 2003; Baines & Blatchford, 2009; Berndt & Hoyle, 1985; Bowker, 2004; Degirmencioglu et al., 1998; Rubin et al., 2006; Sebanc et al., 2007; see also Poulin & Chan, 2010).

Only a few have studies have used up to seven waves (Poulin & Chan, 2010; Wölfer et al., 2015). However, it is often prohibitively costly and logistically complex to undertake such multi-wave studies, while multiple waves may eventually be an intrusion for the children and the school (Poulin & Chan, 2010; Wölfer et al., 2015). Poulin and Chan (2010) suggest that two waves of data collection six months apart (when the school year begins and then six months later at the midpoint of the school year) offers the best and most stable friendship networks. This two-wave methodology was adopted in the present study.

## Approaches to Assessing the Stability of Peer Friendships

When measuring the stability of peer friendships using a social network approach, one can do so either prospectively or retrospectively (Troutman & Fletcher, 2010). The prospective approach is more commonly used, and assesses whether a friendship that is present at one point is present at another subsequent time point (Troutman & Fletcher, 2010). The retrospective approach assesses friendship in terms of how long a friendship is maintained or not (i.e., how long has the friendship being nominated now been in existence; Troutman & Fletcher, 2010). The retrospective approach gives important information on friendship maintenance patterns, as opposed to a stricter focus on stability per se (Troutman & Fletcher, 2010). The present study, with its focus on friendship stability, adopted a prospective approach to stability that focused on whether a friendship being nominated now will also be nominated at some time point in the future.

**Calculating the stability of friendship networks.** The stability of social networks can be calculated using one of two methods (Baines & Blatchford, 2009). The first method divides stability into three categories, namely *completely stable*, *primarily stable*, and *primarily unstable*. If the network is completely stable, then 100% of the connections between members are identical over time. If the network is primarily stable, 51% or more of the connections between members are stable over time. Finally, if the network is primarily unstable, 50% or fewer of the connections between members are stable over time (Baines & Blatchford, 2009).

The second method calculates the proportion of change or instability in the social network, which is important as it provides an index of impact of friendship loss (Ellis & Zarbatany, 2007). The impact of losing five of ten friends might be less than losing one of two friends (i.e. a loss of 50% in both cases; Ellis & Zarbatany, 2007). This method considers the stability of each individual's connections to others within the social network. More specifically, it calculates the proportion of nominations (ties) at the first time point of data collection that are nominated by each child at a later (second) time point (Baines & Blatchford, 2009). The social network analysis programs that were employed to analyse the longitudinal data in the present study (i.e., Simulation Investigation for Empirical Network Analysis; SIENA and UCINET) are coded with this assumption. As such, this second method of calculating network stability was employed in the present study. Having concluded the brief overview of the application of social network analysis to the investigation of peer friendships, I now turn to the rationale and methodology of the present study.

## **The Present Study**

Peer friendships in early childhood friendships are distinctly different from parental or familial relationships (Louw & Louw, 2014; Poulin & Chan, 2010), and they are likely to have an influential role in childhood development if the friendship is considered high in quality and relatively stable over time (Poulin & Chan, 2010). Children who experience issues maintaining friendships (i.e., unstable friendships) are more likely to have trouble with psychosocial adjustment (Poulin & Chan, 2010). As such, research on those factors that promote friendship development and friendship stability during early childhood is important, and can offer parents and teachers with the necessary guidance for assisting the children during early childhood with establishing healthy, lasting peer friendships.

Given the relative importance of this research, it is surprising that there has not been more research along these lines of enquiry. For example, Poulin and Chan (2010) report that fewer than 40 articles have examined friendship stability and only one third of these articles cited stability as their primary variable (see also Cappella et al., 2012). As such, those factors that predict the stability (or instability) of peer friendships amongst preschool children remains underexplored (Ellis & Zarbatany, 2007; Troutman & Fletcher, 2010), and an extensive literature search yielded no South African literature in this regard.

This gap in the literature was addressed in the present study by investigating those factors that predict the formation and stability of peer friendships amongst a group of preschool children in Stellenbosch, Western Cape. Specifically, this study investigated two broad research questions. Firstly, what factors predict friendship formation (outgoing nominations), popularity (incoming nominations) and friendship stability amongst preschool children in South Africa? Secondly, to what extent are friendship networks amongst preschool children in South Africa stable or unstable over a nine-month period? This research contributes to the limited longitudinal research on peer friendships during early childhood by contributing much needed South African longitudinal data to the literature. The advanced statistical methodology employed in this study further advances the international literature in this field, and makes it possible to explore the dynamics of dyadic friendships within the context of the broader social context in which they occur.

## Hypotheses

The two broad research questions were explored across eight hypotheses. The first research question was addressed across the first three hypotheses (predictors of friendship formation), while the second research question was addressed across the remaining five hypotheses (predictors of friendship stability). Specifically, amongst a sample of South African preschool children:

**Hypothesis 1a:** Gender, age, and ethnic homophily (similarity) will be significant predictors of friendship formation (e.g., Aboud & Mendelson, 1996; Gifford-Smith & Brownell, 2003; Martin, Fabes, Hanish, & Hollenstein, 2005; McGlothlin & Killen, 2005; McPherson, Smith-Lovin' & Cook, 2001; Rubin, Bukowski, & Parker, 1998; Rubin, Wojslawowicz, Rose-Krasnor, Booth-LaForce & Burgess, 2006);

**Hypothesis 1b:** Classroom propinquity (i.e., being assigned to the same classroom as potential friendship peers) will be a significant predictor of friendship formation (e.g., de Klepper et al., 2010; Gifford-Smith & Brownell, 2003; Troutman & Fletcher, 2010);

**Hypothesis 1c:** The propinquity effect hypothesised in 1b above will be a stronger predictor of friendship formation than the homophily effect hypothesised in 1a above;

**Hypothesis 2a:** Reciprocal friendships will be significantly more stable over time than non-reciprocal friendships;

**Hypothesis 2b:** Friendship quality (i.e., best friends compared to other friends) will moderate the stability of friendship over time - specifically, best friend networks will be significantly more stable over time compared to other friend networks;

**Hypothesis 2c:** Homophilous friendships (similarity in terms of gender, age, ethnicity as well as culture and religion) will be significantly more stable over time compared to heterophilous friendships;

**Hypothesis 2d:** Friendships formed between children in the same classroom (i.e., greater propinquity) will be significantly more stable over time compared to cross-classroom friendships; and

**Hypothesis 2e:** The propinquity effect described in hypothesis 2d will have a stronger effect on stability than the homophily effects described in hypothesis 2c.

## The Preschool Context

The setting of the present study is an independent preschool in Stellenbosch (a semi-urban area situated in the Western Cape, South Africa). Afrikaans, English and Xhosa are the most prominent languages that are either spoken or understood in and around Stellenbosch. This specific preschool has children between the ages of four and six years old and offers a non-traditional approach to early education. The children attending this preschool come from a variety of cultural, linguistic, religious and economic backgrounds. The school has a staff ratio of approximately one staff member to eight children.

**Classroom structure.** The preschool setting of the present study comprises two grades of learning. Grade Reception (Grade R) caters for children aged five to six years old, and Pre-Grade Reception (Pre-Grade R) caters for children aged four to five years old. The school also offers two language streams for instruction, English and Afrikaans, as per the choice of the parents. The Language-in-Education policy put forward by the Department of National Education in South Africa recommends that children should learn and be educated in their home-language, and that this is especially important in early education (Department of National Education, 2002; Lenyai & de Witt, 2008). As such, these two grades of learning are split by language, to create a school campus comprising four classes: Grade R English, Grade R Afrikaans, Pre-Grade R English and Pre-Grade R Afrikaans.

Each of these four classes are located in a separate classroom, and each has its own established timetable, where children change activity areas depending on the lesson plan for that day. However, this preschool adopts a relatively open-classroom approach to their non-educational approach, such that the classes are not kept entirely apart; there are times when the English and Afrikaans classes in each Grade participate in activities together, as well as free play time where all the children (from all four classes) can play together.

The open classroom settings associated with such a non-traditional approach is generally associated with more frequent, stable and reciprocal peer friendships (Gifford-Smith & Brownell, 2003). There are five areas where children spend much of their time engaged in unstructured activities that, according to Martin et al. (2005), provide a basis for social interaction with peers. The fantasy area allows children to play with dolls or toys that facilitate pretend play. The block area encourages children to play with blocks or toys of various shapes and sizes. The creative area is an area in which the children can paint, draw or colour in pictures. The puzzle area includes puzzles of varying size and complexity. These first four



areas help children develop fine motor skills and planning skills while building. The fifth area comprises two outdoor areas, which facilitate the development of gross-motor skills through exposure to jungle gyms, sandpits, and space for running around and playing outdoor games. There are teachers in each area to guide and assist the children where needed.

During informal observations at the preschool prior to data collection, children from all four classes were observed playing together. Therefore, in theory, peer friendship nominations should not be limited to one class. Instead, each child could nominate anyone from the school campus (i.e., from any or all of the four classrooms) as a friend. This is unique, as most previous studies allow children to only nominate children from their own class (as a bounded population; e.g., Ellis & Zarbatany, 2007; Proulx & Poulin, 2013; Rodkin & Ahn, 2009), which poses the methodological limitation that the smaller the bounded population the fewer nominations are possible by the children (Schneider et al., 2010). The methodology of the present study overcame this potential limitation.

### **Methodology**

The present study used self-reported peer friendship nominations from preschool children, which were collected longitudinally over two time points spaced nine months apart. The first wave of data comprised archival self-report data that were collected in March 2015 as part of a registered Honours Child Psychology assignment for a Community Interaction Project (*Pre-schoolers and Honours Psychology Students: Promoting Positive Interaction*). This service-learning community project provides Honours students the opportunity to gain practical experience formally interacting with preschool children under the necessary professional supervision. The first wave of data collection was undertaken by 26 Honours students registered in the Honours Child Psychology Module. Qualitative excerpts from this data that were collected were used in the research undertaken by Haw (2017).

Retrospective written permission to use the archival self-report data for research purposes, and prospective written permission to collect a second wave of self-reported peer friendship nominations from the children nine months after the first set of data were collected, were obtained from the preschool (see Appendix A) and the parents/legal guardians of each child (see Appendices B and C). Ethics approval for this longitudinal project was granted by the Research Ethics Committee (Humanities) at Stellenbosch University (SU-HSD001725; see Appendix D).



## Materials

The data that were collected from the participants included demographic information relating to each child in the school (provided by the school), and peer nomination data that were collected from each child using individual, child-friendly, semi-structured interviews (see Appendix E).

**Demographics.** The demographic information that were collected included the child's name (for the purpose of matching nominations; thereafter the names were replaced with a participant identification number to ensure anonymity), gender, ethnicity, home language, age, classroom language and classroom. The principal/head teacher provided this information during wave one on behalf of the parents and their children. All the remaining data relating to friendship nominations were collected using a set interview schedule (see Appendix E). This interview schedule enabled the collection of the following data:

**Self-report peer nominations.** The self-report information provided by the participants relating to their peer friendships at school comprised their peer nominations, self-reports on the reasons why they had made the nominations they had made, and a drawing of their best friend at school. The results reported in the present research study only focus on the self-reported peer nominations made by the pre-schoolers.

The semi-structured interviews utilised a modified version of the peer nomination procedure (see Baines & Blatchford, 2009; Betts & Stiller, 2013; Ellis & Zabatany, 2007; Laghi et al., 2014; Proulx & Poulin, 2013; Quinn & Hennessy, 2010; Rodkin & Ahn, 2009; Rubin et al., 2006; Sebanc et al., 2007; Shin et al., 2014). The peer nomination procedure is a self-report method where children nominate other children as their best friend(s) and other friend(s). Shin et al. (2014) found that the child's perspective on friendship better characterises friendships amongst preschool children, as opposed to data collected from teacher reports or family reports on these friendships.

This peer nomination procedure is a highly reliable (with sufficient temporal stability) and valid method for assessing friendships amongst preschool children (Proulx & Poulin, 2013). The eight open-ended peer nomination questions were: (1) *Do you have a best friend?*; (2) *Who is your best friend / What is your best friend's name?*; (3) *Is your best friend at this school?*; (4) *Do you know how old your best friend is?*; (5) *Is your best friend a boy or a girl?*; (6) *Do you have other friends at this school?*; (7) *How many other friends do you have at this school?*; and (8) *What are their names?* (See Appendix E). Some of the qualitative elements

relating to the children's responses to these questions were analysed and reported by Haw (2017).

### **Data Collection Procedure**

The data were collected across two waves during March/April 2015 and November 2015 (approximately nine months apart). The first wave of data were collected with the assistance of 26 Honours Psychology students. The second wave of data were collected with the assistance of five postgraduate research assistants (hereafter referred to as the interviewers). One-on-one interviews with the preschool children were undertaken to collect the data at each time point. Prior to the data collection, the interviewers received in-depth theoretical and practical training on how to conduct child-friendly interviews with preschool children. Each interviewer signed the preschool's confidentiality agreement (see Appendix F), and were matched to interview individual children based on language (either English or Afrikaans) and gender. Each of the child-friendly interviews were undertaken during regular school hours at the preschool itself to ensure that the preschool children felt at ease.

Interviews began with a child-friendly conversation, with the purpose of creating a pleasant, enjoyable atmosphere that builds rapport. The individual interviews were initiated by asking each child whether they have a best friend at school and whether they would like to draw a picture of this friend (see also Haw, 2017). When working with preschool children it is important to employ methods that differ from traditional questionnaires (Hamama & Ronen, 2009) in order to engage in child-friendly research that takes into account children's physical, cognitive and socio-emotional development. The process of using drawing as a medium for communication with preschool children has been regarded as non-threatening means of expression, where children naturally express their ideas of the world through drawing (Hamama & Ronen, 2009; Loxton, 2009; Woolford, Patterson, Macleod, Hobbs & Hayne, 2015). It assists with building a rapport with the child and facilitates self-report amongst preschool children (Loxton, 2009; Woolford et al., 2015). Studies have shown that when using drawing this increases the amount of information that children of all ages report about emotions or events (Laghi et al., 2014; Woolford et al., 2015).

After drawing a picture of their best friend, each child provided the name of this best friend, along with some reasons as to why they considered this peer as their best friend at school. Each child was then given the opportunity to nominate any other peers in their school

who were their friend (over-and-above the best friend they had just drawn a picture of). To ensure that the interview with the child was ended in a meaningful, child-friendly manner, children were given the opportunity to share their favourite story with the interviewer. The interviewers completed notes regarding the child's responses on the interview schedule. The self-report data from each wave were matched over time to create a data set of two-wave longitudinal peer friendship nomination data appropriate for social network analysis.

### **Ethical Considerations**

The data collected from each child at each wave of data collection were treated with the strictest anonymity and confidentiality. No personal identifiers were used in the reporting of the data. The social network data made use of numeric codes (nodes) to identify each participant in the social network. The data from both waves of data were only accessible to the supervisors of the present study. The supervisors of this project kept secured (and, where relevant, password protected) electronic and hard copies of the data, which were securely stored in the Department of Psychology at Stellenbosch University.

### **Chapter Summary**

The preschool setting provides researchers the opportunity to observe new friendships emerging within a naturalistic setting, where young children have regular contact with a large number of peers for the first time, facilitating the development of peer relationships and friendships through both organized and unstructured play activities. While a substantial body of research has examined children's friendships (dyads), there are only a few studies that have attempted to understand how these friendship dyads are embedded within the child's larger social network. Technological advances over the past 50 years have allowed researchers to examine and explore the dynamics of complex relationships, which are embedded within the broader social context in just a few minutes.

Using the commonly adopted method of the top-down approach, which relies on self-report peer (friendship) nomination procedures, the present study aimed to explore the factors that predict friendship formation (both outgoing and incoming nominations) and then examine friendship stability amongst a group of preschool children in Stellenbosch, Western Cape. To this end, data were collected longitudinally over two time points spaced nine months apart.

## CHAPTER FOUR

### RESULTS

#### Participants

In the first wave of data collected in March/April 2015, there were 73 children (39 girls and 34 boys) between the ages of four and six years old enrolled at the senior campus of the preschool. These children account for the entire population attending the senior campus of the preschool. Seventy-two children were interviewed at wave one, with one child unable to participate in this first wave of data collection due to a severe speech impediment.

The data from sixty-nine children (38 girls and 31 boys), between the ages of four and six years old, enrolled at the senior campus of the preschool were collected at wave two in November 2015. At this second wave of data collection, two new children were enrolled in the preschool, while seven children had left the school since the first wave of data collection. Finally, the parents/legal guardians for six of the children withheld consent for their children to participate in this second wave of data collection. As such, the self-reported peer nominations for 59 participants (30 girls and 29 boys;  $M_{\text{Age}} = 4.69$  years old,  $SD = 0.73$ ) were matched across the two waves of data.

#### Preliminary Analyses

##### Matched Sample Demographic Characteristics

The demographic information for each child at wave one are summarised in Table 1. A closer inspection of these data show that there was an almost even split between male and female participants matched over time. Moreover, the majority of participants were aged four to five years old, were predominantly identified as Coloured South African, and indicated English as their home language. Finally, almost three quarters of the participants received school instruction in English, while almost half of the matched sample were located in the Pre-Grade R English class.

Table 1

*Demographics of the Matched Participants at Wave Two (N = 59)*

| <b>Demographic Variable</b> | <b>Category</b>  | <b>Number of Matched Participants (n)</b> | <b>Percentage of Total Matched Sample (%)</b> |
|-----------------------------|--|---|---|
| <b>Gender</b>               | Female   | 30  | 50.8  |
|                             | Male   | 29  | 49.2  |
| <b>Ethnicity</b>            | Coloured South African                                   | 41  | 69.5  |
|                             | Black (African) South African                            | 13  | 22.0  |
|                             | White South African                                      | 2   | 3.3   |
|                             | Libyan   | 3   | 5.1   |
|                             | Mauritian  | 1   | 1.7   |
| <b>Home Language</b>        | English  | 24  | 40.7  |
|                             | Afrikaans  | 20  | 33.9  |
|                             | isiXhosa   | 7   | 11.9  |
|                             | Other (Incl. Shona, Sepedi, isiZulu, Arabic, & Malagasy) | 8   | 13.6  |
| <b>Age Group</b>            | 4-5 years old  | 36  | 61.0  |
|                             | 5-6 years old  | 23  | 39.0  |
| <b>Classroom Language</b>   | English  | 42  | 71.2  |
|                             | Afrikaans  | 17  | 28.8  |
| <b>Classroom</b>            | Pre-Grade R English                                      | 28  | 47.5  |
|                             | Grade R English  | 14  | 23.7  |
|                             | Grade R Afrikaans  | 9   | 15.3  |
|                             | Pre-Grade R Afrikaans                                    | 8   | 13.5  |

### Descriptive Social Network Statistics

In order to get descriptive statistics on individuals within the network and to understand how these individuals interact within the whole network, a social network analysis using

UCINET (version 6.322) was undertaken. This analysis allows for the estimation of centrality (individual) and cohesion (whole network) parameters (Borgatti, Everett, & Freeman, 2002). Network characteristics (statistics) relating to network density, dyad reciprocity, in-degree centralisation, and out-degree centralisation were evaluated at each wave. For visualization purposes, six social networks (Best Friend Network at wave one, Best Friend Network at wave two, Other Friends Network at wave one, Other Friends Network at wave two, Combined Friends Network at wave one, and Combined Friends Network at wave two) were drawn with NetDraw (Borgatti, 2002; Borgatti et al., 2002), a dedicated network visualization software program. Each diagram is divided into approximately four quadrants, each representing a different classroom. Green double-headed arrows indicate reciprocal ties between network members and black single-headed arrows indicate unidirectional ties between network members. Blue shapes indicate male network members and pink shapes indicate female network members. The results are discussed by friendship group in the following order of network ties: combined friends, best-friends and other friends (see Table 2 below).

**Combined friends network characteristics.** Network density is calculated as a ratio of the number of observed ties to the total number of possible ties, and represents the proportion of ties present. There were 3,143 ties possible in the sample. As summarised in Table 2, the number of actual ties made are similar across both waves. For the combined friends category, 5% of all possible ties (171 ties out of a possible 3,143 total ties) were made at wave one (see Figure 1), whereas 5.4% of all possible ties (184 ties out of a possible 3,143) were made at wave two (see Figure 2). A comparison of these probabilities over time yielded a non-significant z-score ( $z\text{-score} = 0.10$ ;  $p\text{-value} = .46$ ), indicating that the increase in the number of ties over time was non-significant, using an alpha of  $p < .05$ . The network parameters generated for the combined friends network across the two waves were significantly correlated ( $r^2 = 1.00$ ;  $p > .01$ ). Visually, it is also difficult to observe any differences in the number of ties across the two waves when comparing the ties represented in Figure 1 with those represented in Figure 2.

The average number of ties for each person in the network at each time point is reflected by the ‘average degree’ statistic. At wave one, each child was associated with an average of 2.9 nominations (irrespective of direction of these nominations, i.e., whether the child sent or received any of these nominations). This increased to 3.15 nominations associated with each child at wave two, although this increase was not significant ( $p > .05$ ).

Table 2

*General Cohesion Descriptive Statistics Reported By Friendship Group*

| Parameter   | Combined<br>Friendship Network |                   | Best<br>Friends Network |                   | Other<br>Friends Network |                   |
|---|--------------------------------|-------------------|-------------------------|-------------------|--------------------------|-------------------|
|   | Wave one<br>(March)            | Wave two<br>(Nov) | Wave one<br>(March)     | Wave two<br>(Nov) | Wave one<br>(March)      | Wave two<br>(Nov) |
| <b>Network Density<br/>(Average degree)</b>                   | 0.05<br>(2.90)                 | 0.05<br>(3.15)    | 0.02<br>(1.05)          | 0.02<br>(1.17)    | 0.05<br>(3.12)           | 0.06<br>(3.53)    |
| <b>Dyad Reciprocity</b>                                       | 0.25                           | 0.25              | 0.27                    | 0.19              | 0.14                     | 0.17              |
| <b>In-Degree<br/>Centralization<br/>(Average in-degree)</b>   | 0.09<br>(4.24)                 | 0.08<br>(4.83)    | 0.05<br>(1.14)          | 0.05<br>(1.24)    | 0.14<br>(3.12)           | 0.08<br>(3.53)    |
| <b>Out-Degree<br/>Centralization<br/>(Average out-degree)</b> | 0.13<br>(4.25)                 | 0.12<br>(4.80)    | 0.05<br>(1.12)          | 0.07<br>(1.24)    | 0.09<br>(3.14)           | 0.08<br>(3.53)    |

Dyad reciprocity refers to the proportion of reciprocated ties (in relation to unreciprocated ties) in a network. Dyad reciprocity remained unchanged (25%) between wave one and wave two for the combined friends network (see Table 2).

Degree centrality refers to the number of connections an actor (i.e., participant) has within the network. In-degree ties refer to ties received (indicating popularity), whereas out-degree centrality refers to ties sent (nominations made; indicating influence). An in-degree centralization estimate close to zero reflects an equal power network (where all participants have a similar or equal status within the group), while an in-degree centralization estimate approaching one reflects a hierarchical network (where some participants hold more power or are more popular than others). The combined friendship networks is characterized as being equal in power at each time point. In the combined friends network in and out-degree centralization decreased over time, indicating that children were receiving and sending fewer nominations at wave two compared to wave one (see Table 2). These differences, however, were non-significant ( $p > .05$ ). These results for the Combined Friends networks are decomposed into Best Friend and Other Friend networks below.



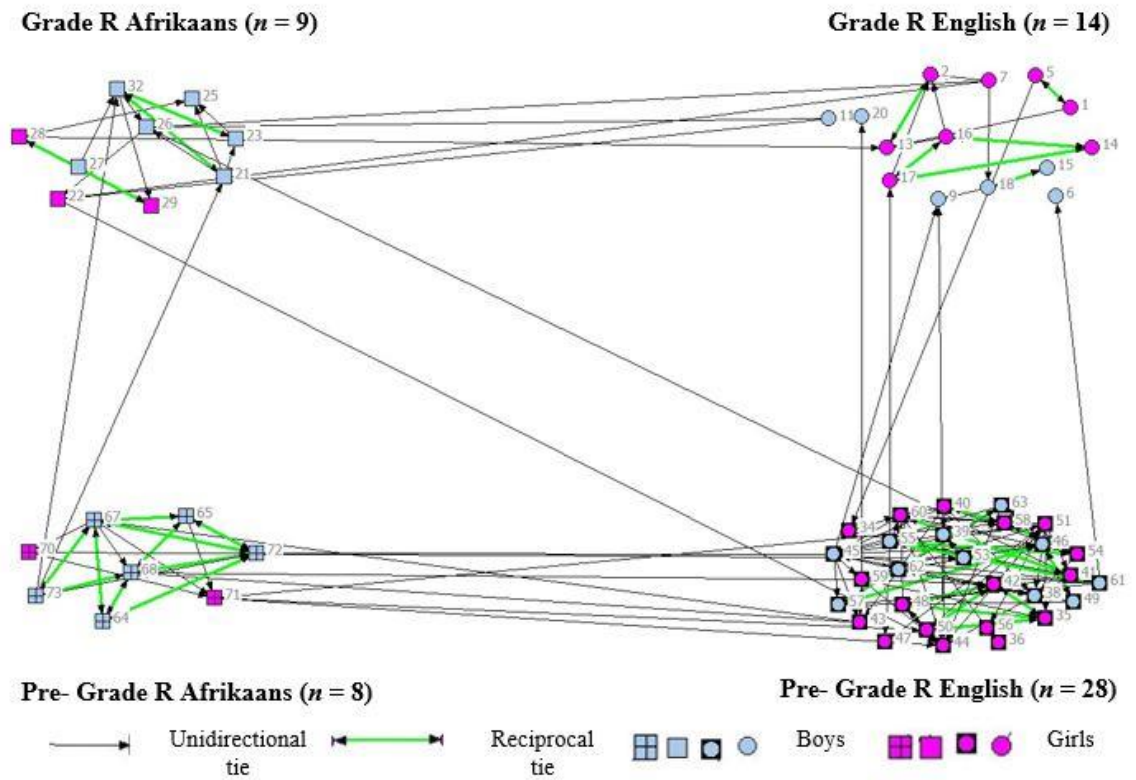


Figure 1. Anonymous combined friendship network (Wave one)

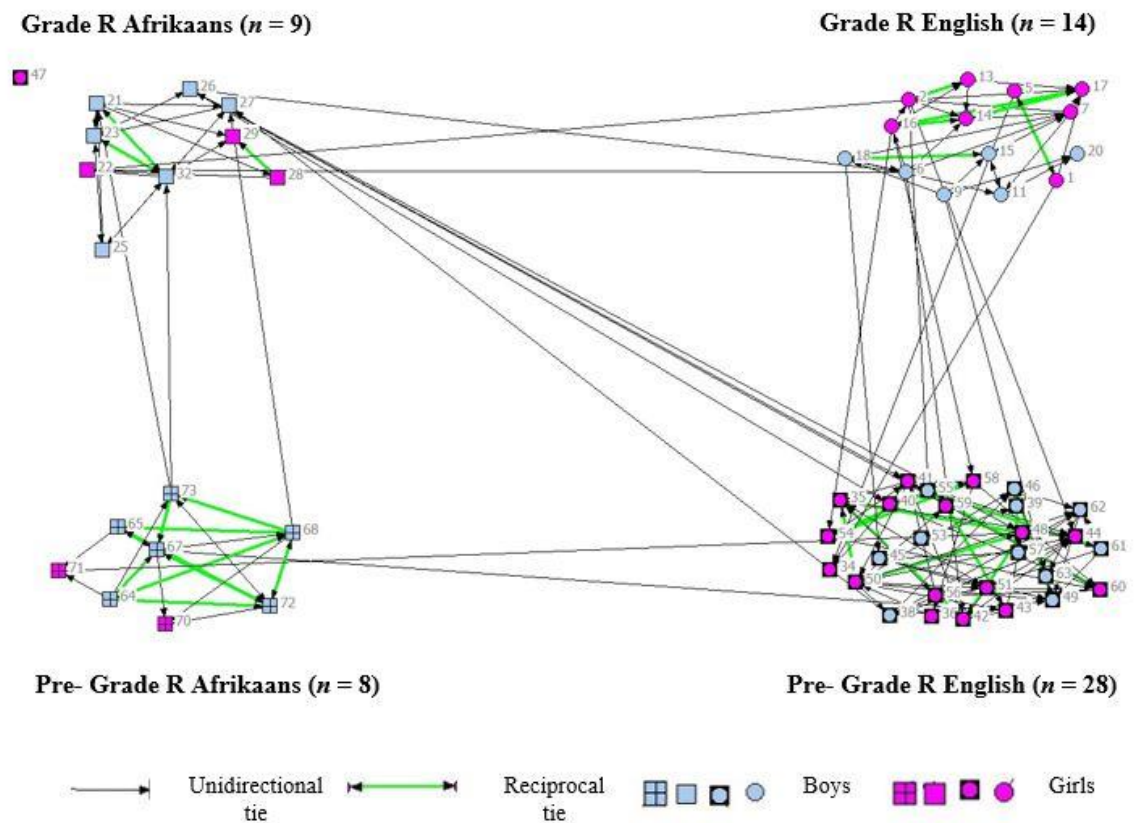


Figure 2. Anonymous combined friendship network (Wave two)



**Best friends network characteristics.** Best friend nominations at wave one and wave two are visualised in Figure 3 and Figure 4 respectively. The number of best friend ties made (i.e., network density) was similar over time. Only 1.8% of possible best-friend nominations (62 out of a possible 3,317) were made at wave one, and 2% were made at wave two (69 out of a possible 3,317). Comparing these proportions over time yielded a non-significant z-score ( $z\text{-score} = -0.08; p = .47$ ), indicating that the increase in the number of ties over time was non-significant.

The average best friend nominations associated with each child showed a non-significant ( $p > .05$ ) increase from wave one (1.05 nominations) to wave two (1.17 nominations; see Table 2). Best friend dyad reciprocity decreased from wave one (27%) to wave two (19%). A comparison of the proportion of best friend dyad reciprocity over time indicated that this decrease over time was non-significant ( $z\text{-score} = 0.97; p = .17$ ).

Children received marginally fewer best friend nominations at wave two as compared to wave one. However, a comparison of the in-degree centralization estimates at wave one (0.05) and wave two (0.05) showed that this decrease over time was non-significant ( $p > .05$ ). Finally, the out-degree centralization estimate showed a non-significant ( $p > .05$ ) increase from wave one (0.05) to wave two (0.07), indicative of a non-significant increase in best friend nominations being sent out over time.

**Other friends network characteristics.** A similar number of ties were made in the other friends network (visualised in Figure 5 and Figure 6) over time (see Table 2). Only 5.4% of all possible ties (183 out of a possible 33,083) were made at wave one, while 6.1% of all possible ties (208 out of a possible 33,083) were made at wave two. Comparing these proportions over time yielded a non-significant z-score ( $z\text{-score} = -0.16; p = .44$ ). The average other friend nominations associated with each child showed a non-significant ( $p > .05$ ) increase from wave one (3.12 nominations) to wave two (3.53 nominations).

The total proportion of reciprocal other friend ties showed a non-significant ( $p > .05$ ) increase from wave one (13.6%) to wave two (16.9%;  $z\text{-score} = -0.5; p = .31$ ). Although children received fewer other friend nominations at wave two (0.14) as compared to wave one (0.08), the decrease in the other friends in-degree centralization parameter over time was non-significant ( $p > .05$ ). Similarly, a comparison of the out-degree centralization estimates for wave one (0.08) and wave two (0.09) yielded a non-significant ( $p > .05$ ) change in other friend nominations being sent over time.

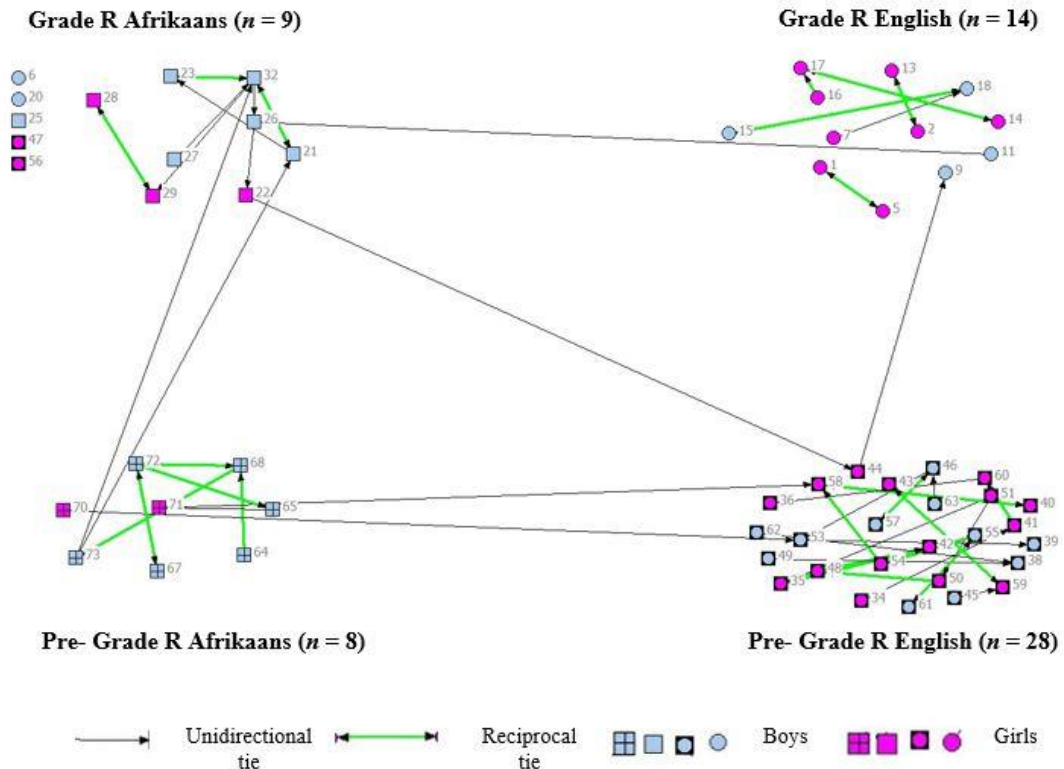


Figure 3. Anonymous best-friend network (Wave one)

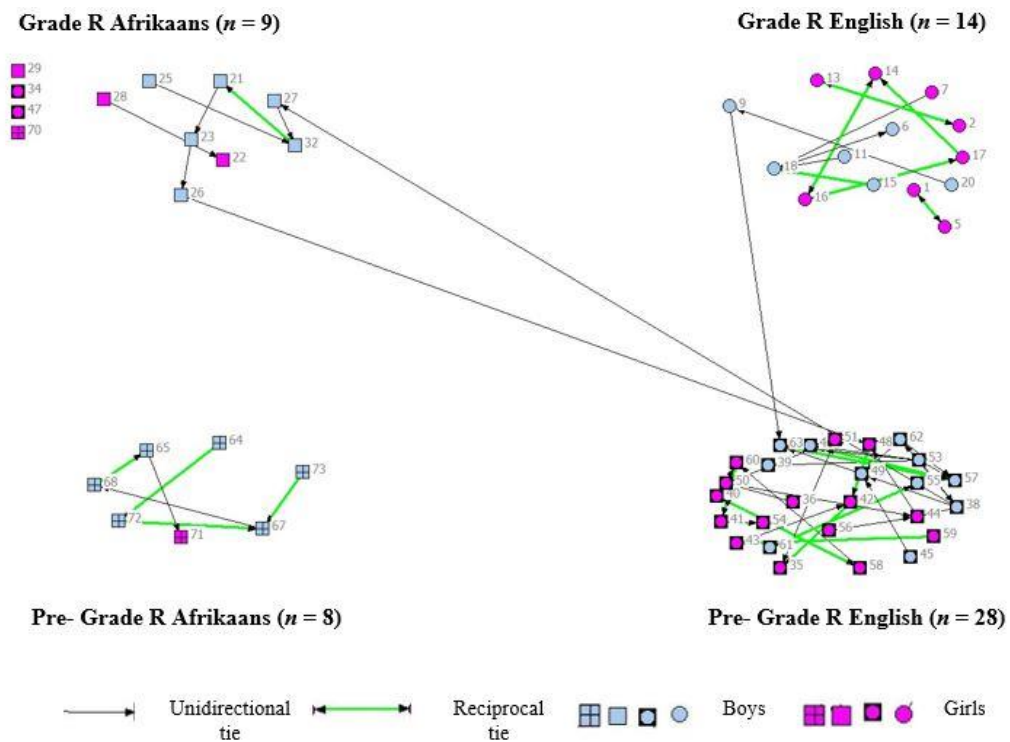


Figure 4. Anonymous best-friend network (Wave two)

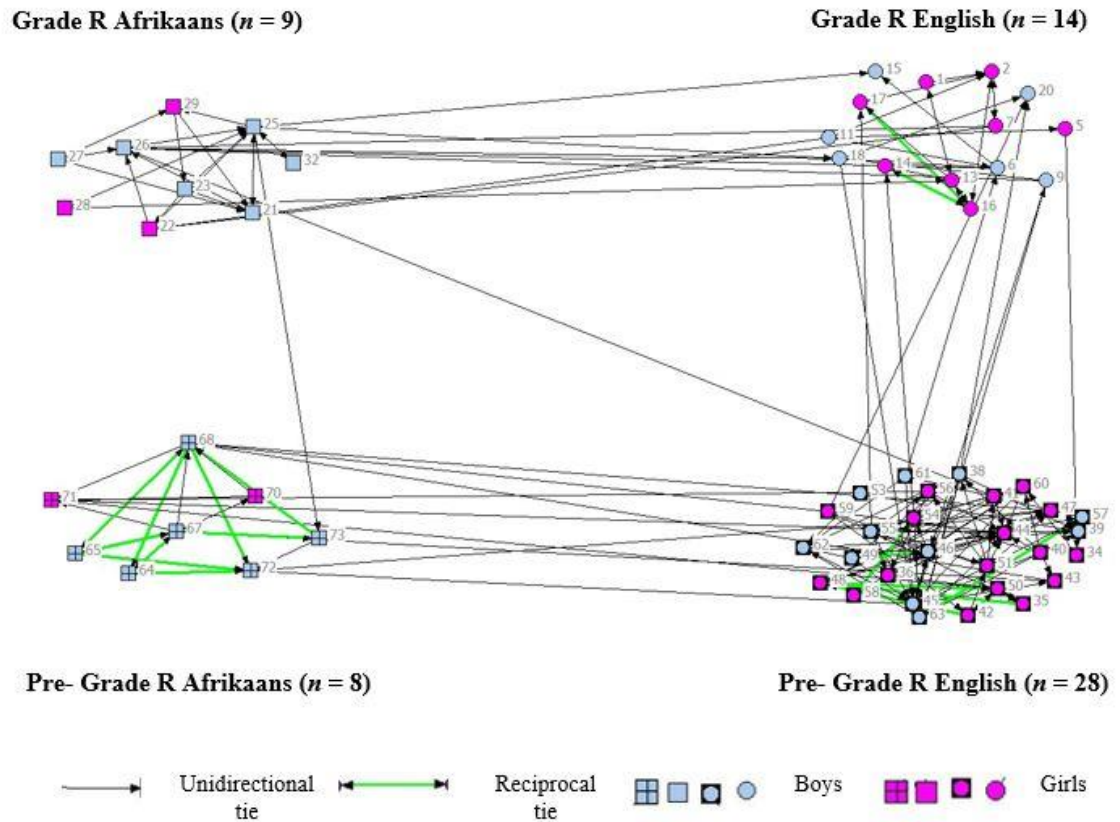


Figure 5. Anonymous other friend network (Wave one)

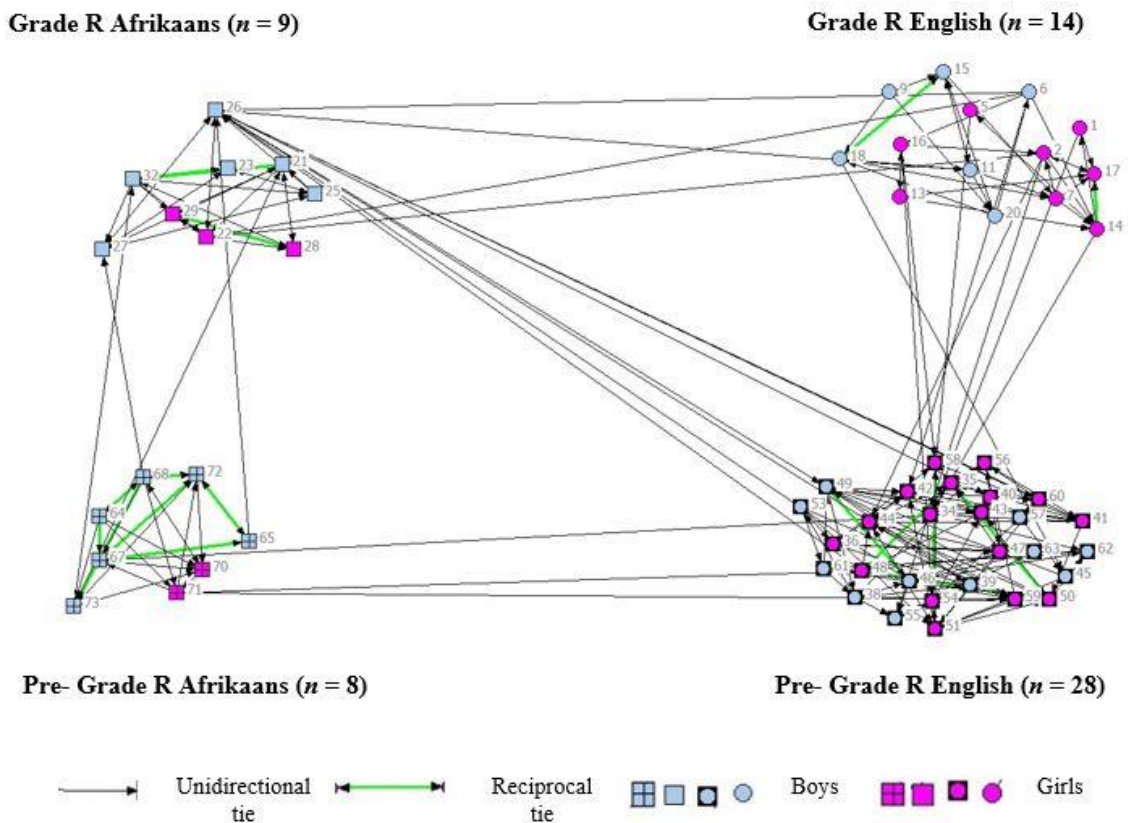


Figure 6. Anonymous other friend network (Wave two)

## Main Analyses

The main analyses tested the eight hypotheses associated with the present study by investigating the underlying network dynamics of the social networks that were described above. Network dynamics refer to the particular selection effects that drive peer nomination within a social network, and they demonstrate the influence of individual characteristics like as gender, classroom language, classroom, home-language or ethnicity on network formation and network stability over time.

The two most important parameters of network dynamics are the evaluation function and the endowment function. The evaluation function estimates an individual's tendency to form network ties, while the endowment function models the tendency to maintain or dissolve a tie or ties in their social network. Comparable to the method of generalized linear models, the probability of individual change within the network uses linear combinations of different network effects.

The network dynamics for the various social networks were analysed using the actor-based stochastic modelling in the Simulation Investigation for Empirical Network Analysis (SIENA, version 3.11; Snijders, Steglich, Schweinberger, & Huisman, 2007) software programme in StOCNET (version 1.8). SIENA is an advanced and popular statistical tool for longitudinal social network analysis because it facilitates the explanation of modifications within succeeding networks (Wölfer & Scheithauer, 2014).

The friendship nominations were not limited to classroom, and children could nominate children from the entire school, and so all four classroom networks were coded into one school network (across three sub-networks: combined friends, best friends, and other friends). Friendships were coded as one (1) to indicate a tie between individuals within the network and zero (0) to indicate no tie between individuals within a network. A linear combination of different effects are used to determine the dynamics within a network. This approach is analogous to estimating the probability of whether an individual will establish a network tie using multinomial logistic regressions (Wölfer et al., 2015). These effects can be interpreted as log-odds ratios and, after an exponential function with a base  $e$  (i.e., Euler's number  $e^x$ ), as odds ratios (Wölfer et al., 2015). The combined friends network was used for most of the analyses that follow below. When comparisons between best friends and other friends were meaningful, these two friendship networks were used instead of the combined friends network (e.g., for testing Hypothesis 2a and Hypothesis 2b).

### **Predictors of Friendship Formation (Hypothesis 1a, Hypothesis 1b, and Hypothesis 1c)**

A range of covariate effects were modelled to test those factors that predict the likelihood of nominating a particular individual within the network as a friend. Covariate effects, or network effects linked to the demographic information of network members, can be modelled in SIENA in order to better understand how individual actors (i.e., children) are behaving in the network. Three main categories of covariate effects were estimated: covariate ego effects, covariate alter effects, and covariate same effects.

Covariate ego effects refer to the tendency that individuals who score high on a particular covariate (or demographic variable; e.g., gender) form friends with (or send ties to) others. Using the example of gender, covariate ego effects allow one to compare the tendency of male children to form friends with others with the tendency of female children to form friends with others.

Covariate alter effects identify those characteristics that are associated with a greater likelihood of receiving a friendship nomination (i.e., popularity). The covariate alter effect for each demographic variable can be used to calculate the probability for children who score high on a given demographic variable to receive a friendship tie.

Covariate same effects refer to the tendency for individuals to form friendships with others who identify as being similar on a given covariate (or demographic variable; e.g., gender). A summary of the parameters associated with the various covariate effects that were modelled is provided in Table 3.

The out-degree (density) parameter in Table 3 reflects the tendency for a child to nominate any random child within the network boundary as a friend, independently of specific covariates. This estimate is analogous to the basic intercept in a regression equation (i.e., where a linear equation predicts the dependent variable values as a function of the independent variables; e.g., gender, home language, age and classroom language; Veenstra & Steglich, 2012). In this sample, children significantly disfavour ( $e^{-8.82} = 0.0001$ ;  $p < .001$ ) the tendency to establish a network tie with a random member of the network. This finding corresponds to the vast majority of other SIENA effects reported throughout the results section. In other words, children choose their friends strategically and purposefully based on certain properties. These properties can be uncovered using SIENA and are said to be the drivers of friendships.

Table 3

*Covariate Effects for Combined Friends Network*

| Covariate Effect                      | Estimate | Standard Error | <i>t</i> -statistic (df = 58) | Log Odds Ratio based on an Exponential Function ( <i>e</i> ) |
|---------------------------------------|----------|----------------|-------------------------------|--|
| <b>Covariate Ego Effects</b>          |          |                |                               |  |
| <b>Out-degree (density)</b>           | -8.82    | 1.50           | -5.87***                      | 0.0001   |
| <b>Classroom Language (Afrikaans)</b> | 1.65     | 0.77           | 2.16*                         | 5.21   |
| <b>Home-language English</b>          | 1.34     | 0.45           | 2.95**                        | 3.82   |
| <b>Gender</b>                         | 1.30     | 0.31           | 4.19***                       | 3.67   |
| <b>Age</b>                            | 0.48     | 0.25           | 1.96*                         | 1.62   |
| <b>Ethnicity: Libyan</b>              | 0.75     | 1.35           | 0.56                          | 2.12   |
| <b>Ethnicity: Coloured</b>            | -0.38    | 0.45           | -0.85                         | 0.68   |
| <b>Ethnicity: Black</b>               | 0.35     | 0.62           | 0.58                          | 1.42   |
| <b>Home-language: Afrikaans</b>       | 0.79     | 0.83           | 0.96                          | 2.20   |
| <b>Home-language: Xhosa</b>           | 0.96     | 0.59           | 1.62                          | 2.61   |
| <b>Covariate Alter Effects</b>        |          |                |                               |  |
| <b>Classroom Language (English)</b>   | -1.09    | 0.40           | -2.89**                       | 0.34   |
| <b>Age</b>                            | -1.19    | 0.25           | -4.69***                      | 0.30   |
| <b>Gender</b>                         | -1.16    | 0.28           | -4.15***                      | 0.31   |
| <b>Ethnicity: Libyan</b>              | -0.65    | 0.49           | -1.32                         | 0.52   |
| <b>Ethnicity: Coloured</b>            | -0.19    | 0.48           | -0.25                         | 0.83   |
| <b>Ethnicity: Black</b>               | -0.08    | 0.45           | -0.19                         | 0.92   |
| <b>Home-language: English</b>         | -0.60    | 0.33           | -1.85                         | 0.94   |
| <b>Home-language: Afrikaans</b>       | -0.40    | 0.42           | -0.97                         | 0.96   |
| <b>Home-language: Xhosa</b>           | -0.66    | 0.36           | -1.83                         | 0.52   |
| <b>Covariate Same Effects</b>         |          |                |                               |  |
| <b>Same Classroom Language</b>        | 2.90     | 0.78           | 3.70**                        | 18.17  |
| <b>Same Age</b>                       | 2.64     | 0.39           | 6.84***                       | 14.01  |
| <b>Same Gender</b>                    | 1.79     | 0.35           | 5.17***                       | 5.99   |
| <b>Ethnicity: Libyan</b>              | -0.06    | 1.33           | -0.13                         | 0.94   |
| <b>Ethnicity: Coloured</b>            | 0.11     | 0.41           | 0.26                          | 1.12   |
| <b>Ethnicity: Black</b>               | 0.42     | 0.48           | 0.88                          | 1.52   |
| <b>Home-language: English</b>         | 0.07     | 0.34           | 0.20                          | 1.07   |
| <b>Home-language: Afrikaans</b>       | 0.04     | 0.73           | 0.06                          | 1.04   |
| <b>Home-language: Xhosa</b>           | 0.20     | 0.58           | 0.35                          | 1.22   |

\**p* < .05, \*\**p* < .01, \*\*\**p* < .001



**Covariate ego effects (hypothesis 1a).** The covariate ego effect parameter for each demographic variable can be used to calculate the probability for children who score high on a given demographic variable to form friendship ties using the log-odds ratio after an exponential function. Following an exponentiation function with Euler's number ( $e$ ), the odds ratios can be used to rank effect sizes (with larger odds ratios being more effective; Wölfer et al., 2015).

The data show that children in both the Grade R and Pre-Grade R Afrikaans classes are  $e^{1.65} = 5.21$  times more likely than children in the either of the English classes to form new friends (send ties;  $p < .05$ ). Children who speak English as a home-language are  $e^{1.34} = 3.82$  times more likely than children who speak any other home language (Afrikaans or Xhosa) to form new friends (send ties;  $p < .01$ ). Moreover, boys are  $e^{1.30} = 3.67$  times more likely than girls to form new friends (send ties;  $p < .001$ ). Additionally, older children (children aged five to six years old) are  $e^{0.48} = 1.62$  times more likely to form new friends (send ties;  $p = .05$ ). Ethnicity (Libyan, coloured and black) and home-language (for Afrikaans and Xhosa home-language speakers only) were non-significant predictors of friendship formation in all models. These results partially support Hypothesis 1a, confirming that classroom language (for Afrikaans classrooms only), home-language (for English home-language speakers only), gender and age were significant predictors of friendship formation in this sample.

**Covariate alter effects (hypothesis 1a).** The covariate alter effect identifies those characteristics that are associated with a greater likelihood of receiving a friendship nomination (i.e., popularity). As reported in Table 3, classroom language, age and gender were the significantly predictors of receiving a friendship nomination. Children in the English class were  $e^{-1.09} = 0.336$  times more popular than children in Afrikaans classes ( $p < .01$ ), while older children (five to six years old) were  $e^{-1.19} = 0.304$  times more likely than younger children (aged four to five years old) to receive a friendship tie ( $p < .001$ ). Finally, girls were  $e^{-1.16} = 0.313$  times more likely than boys to receive a friendship tie ( $p < .001$ ). Ethnicity (Libyan, coloured and black) and home-language (English, Afrikaans and Xhosa) were non-significant predictors of popularity in all models. These results offer further partial support for Hypothesis 1a, illustrating that classroom language (for English classrooms only), age, and gender were significant predictors of popularity in this sample.

**Covariate same effects (hypothesis 1a).** The same effect describes an actor's preference for forming a tie to someone similar to them on a particular covariate. They are indicative of a child's preferences for demographic homophily (i.e., a so-called homophily effect) and/or classroom homophily (i.e., a so-called propinquity effect). As reported in Table

3, the covariate same effect parameter was significant for gender, age, and classroom language. Children were  $e^{2.90} = 18.17$  ( $p < .01$ ) times more likely to nominate friends who shared the same classroom language (language of tuition) than those who received tuition in a different language of tuition. Children were  $e^{1.79} = 5.99$  ( $p < .001$ ) times more likely to nominate friends who shared the same gender than those who did not, and they were  $e^{2.64} = 14.01$  ( $p < .001$ ) times more likely to nominate friends from the same age cohort than from a different age cohort. The homophily effect was non-significant for ethnicity (Libyan, Coloured, Black) and home-language (English, Afrikaans and Xhosa). These results, too, bolster the partial support for Hypothesis 1a.

**Covariate propinquity effects (hypothesis 1b).** As summarised in Table 4, a significant preference for forming ties to children in the same classroom (i.e., a significant propinquity effect) was observed in all four classes (Grade R English and Afrikaans as well as Pre-Grade R English and Afrikaans). The evaluation parameters in SIENA offer partial support for the propinquity hypothesis (Hypothesis 1b), suggesting that there is a significant preference ( $p < .05$ ) to create ties to children in the same class. Children in the Grade R English class were  $e^{3.00} = 20.09$  ( $p < .01$ ) times more likely than children in other classes to form a friendship with another child in the Grade R English class. Children in the Grade R Afrikaans class were  $e^{1.79} = 5.99$  ( $p < .01$ ) times more likely than children in other classes to form a friendship to another child in the Grade R Afrikaans class. Children in the Pre-Grade R English class were  $e^{1.91} = 6.75$  ( $p < .001$ ) times more likely to form a friendship with another child in the Pre-Grade R English class. Finally, children in the Pre-Grade R Afrikaans class were  $e^{0.64} = 1.90$  ( $p < .05$ ) times more likely to form a friendship with another child in the Pre-Grade R Afrikaans class. These evaluation functions can also be used to rank effect sizes. Grade R English is the largest predictor of within-class friendship, followed by Pre-Grade R English, Grade R Afrikaans and Pre-Grade R Afrikaans classes.

**Comparison of propinquity effects versus homophily effects (hypothesis 1c).** When a network is divided into groups (here it is school classes or classrooms) the E-I index calculates the number of cross-classroom ties minus the number of within classroom ties, divided by the total number of ties in the network. Values approaching -1.00 indicate homophily (within classroom ties) and those approaching +1.00 indicate heterophily (between classrooms ties).



Table 4

*Propinquity Evaluation Estimates for the Combined Friends Network*

| Covariate Same Effect        | Estimate | Standard Error | <i>t</i> -statistic (df = 58) | Log Odds Ratio based on an Exponential Function ( <i>e</i> ) |
|------------------------------|----------|----------------|-------------------------------|--|
| <b>Grade R English</b>       | 3.00     | 0.87           | 3.44**                        | 20.09  |
| <b>Pre-Grade R English</b>   | 1.91     | 0.43           | 4.41***                       | 6.75   |
| <b>Grade R Afrikaans</b>     | 1.79     | 0.58           | 3.10**                        | 5.99   |
| <b>Pre-Grade R Afrikaans</b> | 0.64     | 0.26           | 2.48*                         | 1.89   |

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

**Combined friendship network.** The combined friends network at wave one is characterized as being heterophilous (0.007; see Table 5). This should be interpreted as being more or less equal (i.e., not homophilous or heterophilous) as this value is very close to zero. However, although this value is close to zero, it is still a positive number. Therefore, slightly more friendships were formed between classes compared to within classes at wave one. The same combined friends network is characterized as homophilous (-0.87) at wave two. Therefore, over time, significantly more friendships (both best- and other friends) were formed within classes compared to between classes.

Table 5

*E-I Index by Classroom*

| Friendship Network      | E-I Index |          |
|-------------------------|-----------|----------|
|                         | Wave One  | Wave Two |
| <b>Combined Friends</b> | 0.007     | -0.87    |
| <b>Best Friends</b>     | -0.84     | -0.95    |
| <b>Other Friends</b>    | -0.74     | -0.86    |

**Best friendship and other friendship networks.** Both the best friend and other friend networks are characterized as homophilous (in terms of classroom) at both wave one and wave

two. Both friendship categories become more homophilous (in terms of preferences for within-classroom friendship ties) over time. These results offer additional evidence for the propinquity effect.

The evaluation functions can be used to rank effect sizes and therefore identify the strongest predictor of friendship formation, and make comparisons (between the propinquity effects and homophily effects). The propinquity effect sizes range from 20.09 (Grade R English) to 1.89 (Pre-Grade R Afrikaans). The homophily effect sizes range from 18.17 (classroom language) to 5.99 (gender). A comparison of the evaluation functions for the demographic homophily and propinquity effects shows that three of the five strongest effects (predictors of friendship formation) relate to classroom propinquity, suggesting that the propinquity effect on friendship formation in this sample is on average stronger/greater than the demographic homophily effect on friendship formation.

### **Reciprocity and Friendship Stability (Hypothesis 2a)**

Out of a possible 3,148 nominations in the Combined Friends network (comprising both Best Friend and Other Friend nominations) 171 nominations were made at wave one and 184 at wave two. This is an average of 2.90 and 3.12 nominations per child at each time point respectively. However, the combined friends network seems to be unstable over time since only 76 ties made at wave one (41% of the nominations, whether reciprocal or not) were maintained over the nine month interval between wave one and wave two. In contrast, 108 new ties were gained at wave two (that were not present at wave one) and 95 ties that were present at wave one were absent (lost) at wave two.

The reciprocity evaluation parameter in SIENA represents a child's tendency to establish reciprocal ties (cf. Snijders et al., 2007). As per the reciprocity estimate reported in Table 6 below, children exhibited a significant tendency or preference for forming a reciprocal tie (by returning a unidirectional tie;  $p < .001$ ). More specifically children in the present study were  $e^{1.65} = 5.23$  times more likely to form a reciprocal tie relative to a unidirectional tie.

There were 74 reciprocated ties (out of the total 184 ties that were made) at wave two. Nineteen of the reciprocated ties that were reported at wave one were absent (lost) at wave two. This represents a 10.30% loss of reciprocal ties over a nine-month period in the combined friends network compared to a 52% loss of unidirectional ties in this network over the same time. In other words, 89.70% of the reciprocal ties were maintained in this network, compared

to 48% of the unidirectional ties. As reported in Table 2, the dyad reciprocity estimates in the combined friends network at wave one and wave two were identical (0.25). This estimate indicates that 25% of the friendships in this network were reciprocal at wave one and wave two.

SIENA can model the tendency for an individual to maintain (positive values) or dissolve (negative values) an existing tie within a network. The endowment function can only be modelled if the model fit of the previous reciprocity evaluation function is acceptable and if it is theoretically meaningful to assume the endowment effect (i.e., if you are interested in the stability of ties over time) effect. In other words, an acceptable evaluation function requires that the *t*-ratios should have deviations that approach zero and intercorrelations between the parameter estimates that are low to moderate, which is indicative of good convergence statistics (Wölfer et al., 2015). The endowment reciprocity statistic reported in Table 6 shows that children were  $e^{1.31} = 3.71$  ( $p < .05$ ) times more likely to maintain an existing reciprocal tie than an existing unidirectional tie. These findings support Hypothesis 2a, that reciprocal friendship nominations were significantly more stable over time than non-reciprocal friendship nominations in this sample.

Table 6

*SIENA Evaluation and Endowment Function Reciprocity Effects across Friendship Networks*

| Parameter                       | Estimate | Standard Error | <i>t</i> -statistic (df = 58) | Log Odds Ratio based on an Exponential Function ( <i>e</i> ) |
|---------------------------------|----------|----------------|-------------------------------|--|
| <b>Combined Friends Network</b> |          |                |                               |  |
| <b>Reciprocity Evaluation</b>   | 1.65     | 0.17           | 9.72***                       | 5.23   |
| <b>Endowment Reciprocity</b>    | 1.31     | 0.71           | 1.85*                         | 3.71   |
| <b>Best Friends Network</b>     |          |                |                               |  |
| <b>Reciprocity Evaluation</b>   | 2.11     | 0.7            | 3.01**                        | 8.25   |
| <b>Endowment Reciprocity</b>    | -0.10    | 1.28           | 0.18                          | 0.90   |
| <b>Other Friends Network</b>    |          |                |                               |  |
| <b>Reciprocity Evaluation</b>   | 1.35     | 0.48           | 2.83**                        | 3.86   |
| <b>Endowment Reciprocity</b>    | -0.37    | 0.91           | -0.40                         | 0.69   |

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

## Friendship Quality and Friendship Stability (Hypothesis 2b)

**The stability of best friend nominations.** There were 62 best friend nominations made at wave one out of a possible 3,371 nominations, and 69 best friend nominations were made at wave two (see Table 7). An average of 1.05 and 1.17 best friend nominations were made per child at each respective wave of data collection. However, best friend networks seem to be unstable as only 26 ties were maintained (38% stability) over time, while 43 new ties were formed at wave two, and 36 ties were lost from wave one to wave two. These results suggest that there is relative instability in the best friend networks.

Table 7

*Summary of Tie Types for Best-Friends and Other Friends*

| Parameter                                 | Best Friends | Other Friends |
|---|--------------|---------------|
| <b>Total Possible Ties</b>                | 3,317        | 33,083        |
| <b>Actual Ties Reported</b>               |              |               |
| <b>Wave 1</b>                             | 62           | 183           |
| <b>Wave 2</b>                             | 69           | 208           |
| <b>New Ties (Formed at Wave 2)</b>        | 43           | 156           |
| <b>Lost Ties (Lost at Wave 2)</b>         | 36           | 131           |
| <b>Maintained Ties</b>                    | 26           | 52            |
| <b>(Percentage of All Ties at Wave 2)</b> | (38%)        | (25%)         |

As reported in Table 2, dyad reciprocity in the best friend network at wave one was 0.265, which decreased to 0.190 at wave two. At wave two, there were 22 reciprocated best friend ties (out of the total 69 best friend ties). Ten of these reciprocated best friend ties were lost between wave one and wave two. Thus, only 14.50% of these reciprocal best friend ties were lost over time, compared to a 52% loss of any tie (see Table 7 above). As such, 85.50% of reciprocal best friend ties were maintained over nine months compared to 48% of unidirectional best friend ties. Therefore, the *reciprocal* best friend network can be characterized as being stable even though the *general* best friend network (comprising all best friend ties) is unstable. The significant reciprocity evaluation function associated with these results shows that children were  $e^{2.11} = 8.25$  ( $p < .01$ ) times more likely to form a reciprocal

best friend tie (i.e., returning a unidirectional tie) compared to a unidirectional best friend tie (i.e., sending out a unidirectional tie, where none had previously existed or leaving a unidirectional nomination from a peer unreciprocated).

The non-significant negative endowment reciprocity function in SIENA for the best friend network indicates that children had a non-significant tendency to dissolve an existing best friend tie over time. Children showed a preference for creating a reciprocal best friend tie (between wave one and wave two) but did not have a significant preference for dissolving a best friend tie. Hence, reciprocal best friendships were maintained (stable) over time.

**The stability of other friend nominations.** A total of 186 other friends nominations were made at wave one out of a possible 33,083 nominations, and 208 other friends nominations made at wave two. This is an average of 3.15 and 3.53 other friend nominations per child at each time point respectively. However, the networks seem to be fairly unstable; 52 ties were maintained over time (25% stability), while 156 new ties were formed, and 131 ties were lost from wave one to wave two (see Table 7).

In the other friends network, dyad reciprocity at wave one was 0.136, which increased to 0.169 at wave two. At wave two, there were 60 reciprocated other friend ties (out of the total 208 ties). Twenty-six (out of 208) reciprocated other friend ties were lost between wave one and wave two. This represents a 12.5% loss of reciprocal other friend ties compared to a 63% loss of unidirectional other friend ties. Therefore 87.50% of reciprocal other friend ties were maintained over time, while only 37% of unidirectional other friend ties were maintained over time. Hence, the *reciprocal* other friend network can be characterized as being stable even if the *general* other friend network can be characterized as being unstable.

Children were  $e^{1.35} = 3.86$  ( $p < .01$ ) times more likely to form a reciprocal other friend tie relative to a unidirectional other friend tie. Furthermore, the reciprocity evaluation for other friends in Table 6 is significant ( $p < .01$ ), suggesting that children have a significant preference for forming a reciprocal other friend tie (i.e., returning a unidirectional other friend tie).

The endowment reciprocity effect for other friend ties is negative, indicating the tendency to dissolve an existing tie. However, this effect is non-significant ( $p > .05$ ), suggesting that children were not significantly more likely to end an existing reciprocal other friend tie. Rather, in this sample, children exhibited a preference for creating a reciprocal other friend tie over time, and a non-significant preference for the dissolving an other friendship tie.

In order to assess whether the difference in stability between best friend (38% stability) and other friend (25% stability) nominations was significant, a z-score statistic was calculated. These calculations yielded a significant z-score ( $z = 33.81, p < .001$ ), showing that best friend ties were significantly more stable over nine months when compared to other friend ties. These findings provide robust support for Hypothesis 2b, showing that friendship quality (best friend versus other friend nominations) influences the stability of peer friendships amongst preschool children.

### Homophily and Friendship Stability (Hypothesis 2c)

The endowment function for homophily was calculated in SIENA to determine individual tendencies for maintaining (positive values) or dissolving (negative values) existing ties within a network as a function of demographic homophily. Results from the endowment functions reported in Table 8 below show that even though children were more likely than not to create a homophilous tie, these ties were not maintained over time.

Table 8

*Endowment Function Estimates for Homophily Effects (Combined Friendship Network)*

| Covariate Same Effect           | Estimate | Standard Error | t-statistic (df = 58) | Log Odds Ratio based on an Exponential Function ( $e$ ) |
|---------------------------------|----------|----------------|-----------------------|---|
| <b>Classroom Language</b>       | -2.47    | 2.24           | -3.10**               | 0.08  |
| <b>Age Group</b>                | -3.04    | 0.97           | -3.15**               | 0.05  |
| <b>Gender</b>                   | -1.58    | 1.28           | -1.24                 | 0.21  |
| <b>Ethnicity: Libyan</b>        | -0.28    | 202.08         | -0.001                | 0.76  |
| <b>Ethnicity: Coloured</b>      | -1.36    | 6.27           | -0.22                 | 0.26  |
| <b>Ethnicity: Black</b>         | -0.04    | 7.62           | -0.005                | 0.96  |
| <b>Home Language: English</b>   | -0.86    | 1.20           | -0.79                 | 0.42  |
| <b>Home Language: Afrikaans</b> | -0.99    | 2.91           | -0.34                 | 0.37  |
| <b>Home Language: Xhosa</b>     | -1.44    | 27.65          | -0.05                 | 0.24  |

\*\* $p < .01$

Children in this network were  $e^{-2.47} = 0.08$  ( $p < .01$ ) times more likely to dissolve an existing friendship with other children in the same classroom language stream over time, and they were  $e^{-3.04} = 0.05$  ( $p < .01$ ) times more likely to dissolve an existing same age-group tie over time. The endowment function for same gender and same home language was non-significant. This indicates that, even though children showed a significant preference for creating homophilous ties along these variables (as per the evaluation parameter reported earlier), they did not have a significant tendency to dissolve these same gender and same home language friendships over time (as per the negative endowment function value). These results do not support for Hypothesis 2c; the preschool children in the present study did not have a significant preference for maintaining homophilous friendship ties. Moreover, even though there was a non-significant preference for dissolving same gender and same home language ties amongst this sample, this does not offer any confirmation that there was a significant preference to maintain these ties over time.

### **Propinquity Effects and Friendship Stability (Hypothesis 2d)**

The final two hypotheses aimed to test the propinquity hypothesis, whereby friends formed in the same classroom should be significantly more stable over time compared to friendships formed between classrooms (these cross classroom ties could be between different age groups or different language instruction). The endowment function of SIENA is able to model the ties that were maintained (positive estimates) and the ties that were lost (negative estimates) within a network to assess the stability of within class friendships.

The endowment function estimates highlight a significant tendency to dissolve within-classroom ties over time. Children in the Grade R Afrikaans class were  $e^{-4.23} = 0.015$  ( $p < .05$ ) times more likely to dissolve within-classroom ties than to maintain those ties over time. Similarly, children in the Pre-Grade R English class were  $e^{-2.32} = 0.100$  ( $p < .05$ ) times more likely to dissolve within-classroom ties than to maintain them over time, while children in the Pre-Grade R Afrikaans class were  $e^{-4.42} = 0.012$  ( $p < .05$ ) times more likely to dissolve within-classroom ties than to maintain those ties over time. The endowment function effect for children in the Grade R English class was non-significant, indicating that children in this class did not have a significant preference for dissolving ties with children in the same class over time. Therefore, even though children in all four classes exhibited a tendency to establish ties

with children in the same class (as per Hypothesis 1b above), they exhibited a significant tendency in three of the four classes to dissolve these ties over time.

However, the non-significant ( $p > .05$ ) negative endowment function effect for the Grade R English class indicates that children in the Grade R English class have a non-significant preference for dissolving a previously established tie to another child in the Grade R English class. This pattern of results do not support Hypothesis 2d as there was no evidence that classroom propinquity significantly predicts friendship stability over time in any of the four classes.

Table 9

*Endowment Propinquity Effects (Combined Friendship Network)*

| <b>Covariate Same Effects</b>     | <b>Estimate</b> | <b>Standard Error</b> | <b><i>t</i>-statistic (df = 58)</b> | <b>Log Odds Ratio based on an Exponential Function (<i>e</i>)</b> |
|-----------------------------------|-----------------|-----------------------|-------------------------------------|---|
| <b>Same Grade R English</b>       | -2.60           | 1.78                  | -1.47                               | 0.070   |
| <b>Same Grade R Afrikaans</b>     | -4.23           | 2.10                  | -2.02*                              | 0.015   |
| <b>Same Pre-Grade R English</b>   | -2.32           | 1.09                  | -2.21*                              | 0.100   |
| <b>Same Pre-Grade R Afrikaans</b> | -4.42           | 2.07                  | -2.14*                              | 0.012   |

\* $p < .05$

**Propinquity Effects versus Homophily Effects in Terms of Stability (Hypothesis 2e)**

In order to evaluate whether the effects of propinquity on friendship stability are greater than those of homophily, the effect sizes for these two categories of estimates can be compared. Significant positive endowment effects (i.e., the preference for maintaining a friendship tie) for homophilous or propinquitous friendship ties were not found for any predictor variables. The endowment functions that were significant for propinquity (i.e., Grade R Afrikaans, Pre-Grade R English and Pre-Grade R Afrikaans) and homophily (i.e., age and classroom language) effects were negative, indicating a significant preference for dissolving a friendship tie within classrooms.



These endowment functions can be used to rank effect sizes. According to the absolute size of the estimates summarised in Table 10, the propinquity effects on friendship stability were larger than the absolute size of the homophily effects on friendship stability. However, the impact of both propinquity and homophily on friendship ties was to promote the *dissolving* of friendship ties; in terms of propinquity and homophily, children in this network exhibited a significant preference for dissolving ties over time. As such, although the pattern of results do not strictly support Hypothesis 2e, they do still confirm that the effects of propinquity were consistently stronger than the effects of homophily, but on friendship *instability*, not stability (as originally hypothesised), and confirm the relative importance of propinquity versus homophily as a predictor of the outcome of friendship ties.

Table 10

*Comparison of Endowment Function of Propinquity Effects and Homophily Effects (Combined Friendship Network)*

| Covariate Same Effects     | Estimate | Standard Error | t-statistic (df = 58) | Log Odds Ratio based on an Exponential Function (e) |
|----------------------------|----------|----------------|-----------------------|---|
| <b>Propinquity Effects</b> |          |                |                       |   |
| Same Grade R Afrikaans     | -4.23    | 2.1            | -2.02*                | 0.015   |
| Same Pre-Grade R English   | -2.32    | 1.09           | -2.21*                | 0.100   |
| Same Pre-Grade R Afrikaans | -4.42    | 2.07           | -2.14*                | 0.012   |
| <b>Homophily Effects</b>   |          |                |                       |   |
| Age Group                  | -3.04    | 0.97           | -3.15**               | 0.05  |
| Classroom Language         | -2.47    | 2.24           | 3.1**                 | 0.08  |

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

### Chapter Summary

The results of the present study offer partial support for each of the three hypotheses relating to friendship formation. Firstly, in partial support of Hypothesis 1a, only gender significantly predicted friendship formation (sending ties) and popularity (receiving ties).

However, other factors (not originally hypothesised) such as classroom language (i.e., the Afrikaans language stream) and home-language (i.e., English) were found to also significantly predict friendship formation. Secondly, as hypothesised in Hypothesis 1b, significant propinquity effects were found in all four classrooms; children in this sample exhibited a significant preference for establishing friendship ties with other children in their class as opposed to children in other classes. Thirdly, Hypothesis 1c received support; the propinquity effect on friendship formation was significantly greater than the homophily effect on friendship formation.

The results of the present study also offer partial support for the five hypotheses that relate to the stability of friendship ties over time. As per Hypothesis 2a, reciprocal friendships in all three categories (combined friends, best friends, and other friends) were significantly more stable over time compared to the unreciprocated (unidirectional) friendships in each category. In support of Hypothesis 2b, friendship quality (best friends versus other friends) was a significant moderator of friendship stability over time; best friend ties were significantly more stable over time than other friend ties. Hypothesis 2c was not supported; demographic homophily was not a significant predictor of friendship stability over time (even though it was a significant predictor of friendship formation (observed while testing Hypothesis 1a). Hypothesis 2d was also not supported; propinquity was not a significant predictor of friendship stability over time in any of the four classes. Finally, even though propinquity did not have a significantly stronger effect on friendship stability than homophily, as originally predicted Hypothesis 2e, the propinquity effect was found to be a stronger predictor of friendship *instability* than the homophily effect, confirming the importance of propinquity relative to homophily.

## CHAPTER FIVE

### DISCUSSION

Most of the research on friendship stability during childhood has been undertaken amongst children in middle childhood and adolescents. Recent international research has begun to explore friendship stability amongst preschool children (e.g., Ellis & Zabatany, 2007; Santos et al., 2015; Troutman & Fletcher, 2010). However, no comparable South African studies on friendship stability in early childhood have been published to date. Furthermore, most of the available research on friendship stability have employed rather basic statistical methods (i.e., regressions, correlations, Chi-square tests, t-tests, or simple descriptive statistics such as frequencies or percentage differences between groups; see also Engle et al., 2011; Laghi et al., 2014; McChristian et al., 2012; Rodkin & Ahn, 2009; Rubin et al., 2006; Troutman & Fletcher, 2010). Few studies have used advanced statistical analyses (i.e., SIENA; Schaefer et al., 2010) to explore friendship stability in early childhood. As such, a need for further, more advanced research on friendship stability – most notably in the South African context – was identified. The present study aimed to address these limitations. Specifically, it aimed to explore the longitudinal predictors of friendships and the subsequent stability of these friendships amongst a sample of preschool children at a single preschool in Stellenbosch, South Africa. To this end, the present study extended the findings of previous research.

The present study showed that preschool children can reliably report on their friendships, and differentiate best friends from other friends, over time. Employing sophisticated social network analyses, the present study showed that demographic variables (gender, classroom language and home language) and classroom propinquity were significant predictors of friendship formation (outgoing friendship ties) and popularity (incoming friendship ties). Additionally, reciprocity (in all friendship networks), friendship quality (best friendships versus other friendships), predicted friendship stability amongst preschool children. Homophily (only classroom language) and propinquity (children in the Grade R Afrikaans, Pre-Grade R Afrikaans and English classes) predicted friendship network instability (as opposed to the hypothesised stability) amongst preschool children. The key findings of the present study may be summarised as follows: demographic homophily and classroom propinquity are important predictors of friendship formation amongst preschool children, and while the general friendships of preschool children can be characterized as being generally

unstable over time, factors such as friendship reciprocity and friendship quality significantly enhance friendship stability over time.

The results of the present study are discussed below. First, the general cohesion of the network as a whole is briefly discussed. This is followed by a discussion of classroom language, home language, gender and propinquity as predictors of friendship formation, and classroom language, age and gender as predictors of popularity. I then focus on the various factors that affect friendship stability during early childhood, while assessing which of these factors had the strongest influence on friendship stability in the present study. Additionally, the influence of propinquity versus homophily on friendship instability is also discussed. Throughout the discussion, I pay particular attention to the relevance of the present research for promoting early friendships in preschool. An overview of the shortcomings associated with the present research and suggested avenues for future research conclude this chapter.

### **General Social Network Cohesion**

Four broad conclusions can be drawn about the social network cohesion amongst the present sample from the preliminary descriptive analyses. First, there were no significant differences in density, average degree, dyad reciprocity or in-degree and out-degree centralization in the three friendship categories (i.e., combined friends, best friends and other friends) over time. This null finding implies that the two time points were similar in terms of the proportion of ties present (average degree; i.e., the average number of nominations present), regardless of direction, the number of reciprocated ties (as a proportion of unreciprocated friendships) within the networks, popularity (in-degree) and influence (out-degree). A visual comparison of the various statistics at wave one (density, average degree, dyad reciprocity or in-degree and out-degree centralization) and wave two show that they are almost identical, indicating good reliability over time in the present results.

Second, the results reported in this thesis suggest that preschool children are able to differentiate their best friends from their other friends, even though young children in preschool may define friendship differently from older children (Quinn & Hennessy, 2010). Most research examining friendships amongst children tends to look at best friendships while ignoring other friendships (Laghi et al., 2014). Other researchers cluster all friendships (best friends and other friends) together (Laghi et al., 2014). However, friends differ from best friends in that best friends seem to offer more psychological ‘benefits’ (McChristian et al.,

2012; Quinn & Hennessy, 2010). Moreover, the literature reveals that children as young as three have demonstrated more complex play and more social interactions while playing with a best friend compared to other friends (Quinn & Hennessy, 2010). The present research aimed to address these inconsistencies by examining best friends as well as other friendships independently. The descriptive statistics of the present study show that this is possible with a group of children in early childhood (aged four years old to six years old). As such, the present study offers a more nuanced view of friendships amongst preschool children, and argues strongly that these friendship categories should not be collapsed into one broad definition of friendship when undertaking research on peer friendships in early childhood.

Third, although there were quite a few best friend and other friend nominations occurring within this preschool setting, the choice of nominations was not random or indiscriminate; only an average of 5% of the total possible ties were reported by the children (reflecting a low density of network ties amongst this sample over time). The low density score suggests that the nominations made by the children in the present study were deliberate (i.e., the children were not coming up either with names off the top of their head or with names of those who were close by or within eye sight). This further increases confidence in the reliability of the friendship nominations, and overall results. It also corroborates the developmental literature that suggests that children choose friends for a variety of distinct reasons (discussed in more detail below; Niffenegger & Wilier, 1998).

These low density scores are interesting against the backdrop of the friendship policy adopted at the preschool studied in the present research, where children are encouraged to consider everyone in the school as their friends. One would expect that this would have resulted in an overestimation of friendships within the sample. However, the results show that children displayed only a 0.01% preference to form a random tie to any child within the network. In other words, even though children are encouraged to call every child at school their friend, children still chose their friends strategically and purposefully based on certain properties.

The low density scores found in the present study can be explained by two factors: (a) the age of the children within the present study; research has shown that preschool-aged children report having fewer friends in comparison to school-aged children (Hartup, 1992); and (b) a methodological artefact, as the children were not limited in their friendship nominations. Density is calculated as a proportion of nominations made to the total nominations possible. When nominations are limited (e.g., three friends) the total number of nominations possible is determined by multiplying the number of participants by three. However, when the possible

nominations are unlimited (as in the present study) the total number of nominations possible is calculated as the square of the total number of participants. This may artificially depress the perceived density of network ties by creating a significantly larger pool of possible nominations (the square of all participants) relative to the actual number of nominations made.

Fourth, most of the nominations occurred within classrooms as opposed to between classes (as seen in Figures 1-6). This illustrates that children in this sample were more likely to nominate children whom they interact with in class. Although some friendships do occur on the playground, most friendships occur within class. The principle of propinquity assumes that children are more likely to associate with, and become friends with, individuals who are more readily available to them. This is clearly visible in the clustering of friendship ties by classroom in the six social network visualisation diagrams. As such, these results suggest that the classrooms of the preschool could be an important context for establishing friendships, as this is where children spend most of their day exposed to diverse peers (e.g., Betts & Stiller, 2013; McGlothlin & Killen, 2005; Poulx & Poulin, 2013). This has important implications for how teachers arrange their classrooms and structure shared activities in a manner that encourages and fosters peer friendships.

In summary, these general social network cohesion statistics show that, overall, the results of the present study are reliable and that the peer nominations made by the children were deliberate (as opposed to random). With this in mind, I can discuss the network dynamics (e.g., predictors of popularity and outgoing nominations, as well as the predictors of friendship stability) below with greater confidence.

### **Network Dynamics**

The processes that underlie the social networks of preschool children remain largely unexplored (Schaefer et al., 2010). It is complicated to study friendship formation, as there are few easily observable instances of this in the natural world (Schaefer et al., 2010). The preschool context overcomes the potential confounds of studying friendships in contexts where friendship networks may be characterised by previously existing friendships such as at university, summer camps, or training academies (e.g., Conti & Doreian, 2002; Eagle, 2005; Newcomb, 1961; Parker & Seal, 1996; Savin-Williams, 1979; Van Duijn, Zeggelink, Huisman, Stokman, & Wasseur, 2003).

In the preschool context, researchers can study the development of friendships in an environment that offers children new social opportunities with peers for the first time (Schaefer et al., 2010). In addition, as children enter preschool they have reached a social and cognitive level of development that supports lasting (or stable) peer relationships at a time when they are exposed to a diverse selection of peers to choose from (Schaefer et al., 2010). These factors make preschool children a relatively ‘uncontaminated’ population with which to conduct a social network analysis that examines the stability of friendships. Moreover, this adds confidence in the predictors of friendships against the backdrop of the pre-existing boundary of the present preschool.

### **Predictors of Friendships in Early Childhood**

Recognizable demographic characteristics are important for friendship choices in early childhood (Exenberger, 2003). Children readily cite demographic characteristics such as gender, age and ethnicity as motivations for friendships (Exenberger, 2003), and this preference is borne out by the existing literature (e.g., Ellis & Zarbatany, 2007; Gifford-Smith & Brownell, 2003; Urberg & Kaplan, 1989). This can be understood from a Piagetian perspective as preschool children, whom Piaget characterizes as pre-operational thinkers, refer to external, concrete qualities (i.e., physical characteristics, possessions or overt behaviours) when they categorize or describe themselves and/or others (Exenberger, 2003). Moreover, similarity (i.e., homophily) promotes relationship equivalence, positive reinforcement and cooperative interactions (Ellis & Zarbatany, 2007).

**Significant demographic predictors of friendship formation.** Hypothesis 1a predicted that gender, age and ethnicity would be significant predictors of friendship formation (outgoing ties) and popularity (incoming ties or ties received). The results of the present study broadly confirm those of the existing literature (e.g., Niffenegger & Wilier, 1998; Rekalidou & Petrogiannis, 2012) that suggests that children choose their friends strategically and purposefully based on certain demographic properties. In this sample, only classroom language (both English and Afrikaans), gender, age, and home-language (only English home-language) were significant predictors of friendship formation. The three largest predictors of popularity in the present sample were, being in the English classes (i.e., children in the English classes were more popular than children in the Afrikaans classes), followed by being an older child in this network was the second largest predictor of popularity (i.e., older children were more

popular than younger children), and having female as a gender (i.e., girls were more popular than boys). Neither home-language nor ethnicity were significant predictors of popularity.

Howes and colleagues (1988) found that popularity and having friends were related but not identical in preschool children. For example, a child can report having many friends (i.e., nominating many friends) but that does not lead to being popular (i.e., having many children nominate that child as a friend). Popularity leads to an unequal in-degree distribution (i.e., it leads to inequality amongst network members in the number of incoming ties each network member receives).

Popularity is likely to occur early on in the formation of a social network, at a time when individuals are more likely to establish relationships on the basis of superficial, status-linked characteristics (i.e., demographics characteristics that are unevenly distributed; Schaefer et al., 2010). However, during this early network formation period, friendships can be unstable because the formation of these friendships occurs in the absence of meaningful information (Schaefer et al., 2010). This can create substantial uncertainty within a peer network, with the result that peer popularity within the network can change rapidly as the network members gain meaningful information about one another that informs their friendship choices (Schaefer et al., 2010). Schaefer and colleagues (2010) found that popularity amongst preschool children peaks in significance halfway through the school year, at which point peers become increasingly likely to target relationships with peers who appear to be more socially integrated within the broader network (Schaefer et al., 2010).

Longitudinal studies have shown that children who are enrolled in a well-structured and organized preschool program exhibit social skills that make them more popular in Grade One (Erwin & Letchford 2003; Criss, Shaw, Moilanen, Hitchings & Ingoldsby, 2009; Rekalidou & Petrogiannis, 2012). The preschool in the present study is known to be, and has been observed to be, well-structured and organized. Therefore, as the children in the present study spend two years at the preschool it can be assumed that the children in the present study might develop enhanced social skills compared to children who do not attend a well-structured preschool program, thus explaining the enhanced popularity observed in the present study. I now take a closer look at the significant predictors of friendship formation and popularity.

***Classroom language.*** Classroom language was a significant predictor of both friendship formation (outgoing ties) and popularity (incoming ties) amongst the present sample. Covariate ego effects modelled in SIENA indicated that being in the Afrikaans classes



was the biggest predictor of friendship formation. Children in the Afrikaans classes were just over five times more likely than children in the English classes to nominate new friends (send ties) over time. Perhaps this indicates that English children were more selective (or conservative) in sending friendship nominations, or perhaps this is a function of the observation that most of the children in the Afrikaans classes were able to speak English (and therefore had more potential friendship partners to choose from relative to their English counterparts), while most of the children in the English classes were unable to speak Afrikaans.

It is relatively unusual for preschools to offer two language streams (in this case English and Afrikaans) alongside each other. However, in South Africa the Language-in-Education Policy states that as far as possible children should learn in their home-language (Department of National Education, 2002; Lenyai & de Witt, 2008). As a result, some preschools offer parallel-medium instruction (mostly English and Afrikaans). The results of the present study support the relative importance of language in friendship formation; children in the present study were 18 times more likely to form a friendship with another child who is in the same language stream as them.

The classroom language homophily effect could be explained by, or related to, the principle of propinquity (discussed in more detail below). The preschool setting of the present study is divided into two grades (i.e., Grade R and Pre-Grade R), which are further divided into two language streams (i.e., English and Afrikaans), resulting in four classes: Grade R English class, Grade R Afrikaans class, Pre-Grade R English class and Pre-Grade R Afrikaans class. Children spend a significant portion of their day with their classmates, and therefore it is difficult to determine which process is exhibited here (classroom language homophily or classroom propinquity). It is possible that these classroom language homophily effects are moderated to some extent by propinquity (Gifford-Smith & Brownell, 2003). Future research should focus on disentangling these overlapping effects.

Children in this sample showed a preference for forming ties to children in the English classes (observed in both Grade R- and Pre-Grade R-English classrooms). Children in the English classes were slightly more popular than children in the Afrikaans classes. This could be because children in English classes (i.e., English as a classroom language) account for 71.2% of the sample. In South Africa, Afrikaans-speaking people are more likely to be able to speak both English and Afrikaans while not all English-speaking people can speak Afrikaans (de Kadt, 2005). This phenomenon was evident in observations during data collection in the present study. Hoyte et al. (2014) noted that language and effective communication is a key

factor for young children as they form and maintain friends. Friendships in preschool are mostly based on play and during early childhood most children engage in socio-dramatic play (or social pretend play), where children act out roles and characters during imaginative play (Louw & Louw, 2014). This type of play requires communication to create the imaginary scenarios in play (Louw & Louw, 2014). Thus, this could explain why in the present study the children in the English classes were more popular when compared to the Afrikaans children.

**Gender.** Being of male gender was a significant predictor of friendship formation and popularity. In terms of friendship formation, boys were just under four times more likely than girls to form new friends over time. These findings replicate results found in other studies (e.g., Colwell & Lindsey, 2005; Eder & Hallinan, 2017; Lee et al., 2007; Martin & Fabes, 2001; McGlothlin & Killen, 2005; McPherson et al., 2001). These results are consistent with the developmental literature and theories that show that boys have larger friendship networks than girls, especially between the ages of four and six years of age (Sebanc et al., 2007).

Children are able to label the different genders and draw similarities and differences between genders from the age of 36 months old (Fawcett & Markson, 2010; Martin et al., 2005; McPherson et al., 2001). Gender homophily is considered the strongest predictor of friendship amongst preschool children (Fishbein & Imai, 1993; Rekalidou & Petrogiannis, 2012; Santos et al., 2015). For example, Lee and colleagues (2007) and Martin and Fabes (2001) both found that preschool children were significantly more likely to form friendship with others who report having the same gender and that these friendships were more stable over time. The gender homophily observed in friendship formation in the present study, where children were close to six times more likely to select their friendships on the basis of sharing the same gender, replicates results found in other studies relating to friendship formation (e.g., Colwell & Lindsey, 2005; Lee et al., 2007; Martin & Fabes, 2001; McGlothlin & Killen, 2005). Gender homophily effects may be reinforced or exaggerated by social synchrony. Different social worlds are created by the different styles of play that girls and boys engage in with same-sex playmates (e.g., Gifford-Smith & Brownell, 2003; Martin et al., 2005; Hanish & Rodkin, 2007; Rekalidou & Petrogiannis, 2012; Urberg & Kaplan, 1989). This may make it difficult for a child to play with (and befriend) a member of the opposite sex, even if they wanted to (Martin et al., 2005), exaggerating the preference for same-gender friends.

While being male was a significant predictor of friendship formation, being female was a significant predictor of popularity. In the present study, girls were slightly more likely than boys to receive friendship nominations, making girls significantly more popular than boys

within this sample. It is entirely possible that since boys were more generous in sending ties, and girls were more popular (more likely to receive ties), that boys were sending a substantial number of ties to girls, and girls were receiving a considerable number of ties from boys. However, on the whole, the significant homophily effect for gender confirms that in this sample, children preferred to choose friends who had the same gender as them. This confirms earlier research undertaken by Martin and Fabes (2001) that shows that sex accounts for between 70% and 80% of the variance in playmate, or friendship, choice. This gender homophily in friendship choice can be understood from the perspective of the ‘two worlds’ theory (see Gifford-Smith & Brownell, 2003; Hanish & Rodkin, 2007; Urberg & Kaplan, 1989), which describes the separate social worlds that are created by same-sex play (as described in detail earlier). Maccoby (1998) explains that initial same gender play results in two ‘worlds’ of children’s play (i.e., one world of play for girls and one world of play for boys). As such, not only will gender homophily promote the development of these separate social worlds, these separate social worlds will further promote gender homophily in friendship formation.

**Age.** Mixed age settings are important for pro-social behaviour and cognitive development (Gmitrova, Podhejacká, & Gmitrov, 2009; Lemerise, 1997), although children who differ in age by at least two years exhibit a diverse range of ability level in intellect, academic, and social skill (Gmitrova et al., 2009). However, little peer relations in settings occupied by children of different ages remains relatively understudied (Lemerise, 1997). The age group of the child was a significant predictor of both friendship formation and popularity. In terms of friendship formation (sending ties), older children within this sample were significantly more likely to form new friends with other children than were younger children.

Hartup (1976, 1983) discussed that same-age as well as mixed-age friendships offer developmentally important challenges for children. Same-age friendships are considered equal, where children engage in a ‘give and take’ relationship while learning age-appropriate behaviours (Hartup, 1976, 1983; Lemerise, 1997). The equal nature of same-age friendships is thought to stimulate cognitive development (Lemerise, 1997). As such, mixed-age friendships can be characterized as asymmetrical, where older children tend to practise leadership and nurturing roles, and younger children learn to seek help and observe the older children’s more sophisticated behaviours (Lemerise, 1997). The former (the opportunity to practise leadership and nurturing roles) may be one explanation for why older children sent more outgoing friendship ties than younger children.

Given the choice, young children will choose to play with, and become friends with, other children of the same or similar age (Gifford-Smith & Brownell, 2003), an inclination that tends to decrease as children age and move to subsequent grades (McPherson et al., 2001). As such, age homophily is generally a powerful predictor of friendship formation and maintenance amongst younger children (Marsden, 1988), and less so amongst older children (McPherson et al., 2001), which is arguably why older children sent more outgoing ties than younger children in the present study. The preference for befriending peers of the same age group may also be influenced by specific contextual factors (e.g., social synchrony, which contributes to similarity within relationships) and the rapid change in developmental characteristics associated with early childhood (e.g., Farmer & Farmer, 1996; Gifford-Smith & Brownell, 2003; Poulin & Chan, 2010).

In traditional preschool settings, children of different age groups (i.e., children in different classes or grades) do not normally play together, and therefore do not have the opportunity to form friendships. However, the preschool setting of the present study gives children of all ages and school grade the opportunity to play together, as well as eat lunch and snacks together, thus providing them the opportunity to form friendships with children of any age. This structural environment, along with the policy of encouraging friendships with all children would suggest that peer friendships amongst children in this particular preschool are less likely to be driven by age homophily, and instead be driven more by propinquity. However, in the present study, the results showed that, in spite of the increased opportunity to play with children of all ages (i.e., greater propinquity to children of different age groups), children in the present study indicated that they were 14 times more likely to form a friendship with another child of the same age group as them. These results show that within this sample age homophily is far more important than classroom propinquity.

Evidence has shown that interactions with older children (i.e., mixed-age friendships with children who are one or two years older) and adults contribute to cognitive development amongst younger children (Vygotsky, 1986). Younger children can learn and develop as a result of their interactions with the older children (Lemerise et al., 1998; Walden, Lemerise, & Smith, 1999). This is one possible reason why children in the present study (both in the younger and older age groups) showed a preference for forming ties with older children (in other words, older children were significantly more popular – received significantly more nominations – than younger children).

This is surprising, as older children only make up 39% of the sample in the present study. Lemerise (1997) suggests that mixed-age friendships depend on children's social status or popularity. Friendships with older, more popular, children afford children the opportunity to learn socially competent behaviours as well as acquire prestige within the group (Lemerise, 1997). The results of the present study were consistent with those of Ahlbrand and Reynolds (1972) who conducted a study using sociometric tests in a primary school (i.e., amongst slightly older children than in the present study) and found that older children were more popular. Moreover, consistent with the results of the present study, Lemerise (1997) and Lemerise, Harper and Howes (1998) extended these findings and showed that in mixed age settings similar to that of the present study, children who are immediately older than those children making a friendship nomination are more popular than children from the younger age cohort.

**Home language.** English as a home-language was the second biggest predictor of friendship formation; children who spoke English as a home-language were just under four times more likely to form new friends over time compared to non-English home-language speaking children. This result could be because English home-language speaking children made up the largest single language group (40.70%) amongst the children that were sample (see Table 1). Therefore, there were more fellow English home-language peers to select from than any other peers. However, as highlighted above, it was observed that the majority of the children in the Afrikaans classes could also speak English (while the majority of the children in the English classes could not speak Afrikaans). This would further broaden the pool of potential friendship peers for English-speaking children. Home language was not a significant predictor popularity in the present study. As such, children in the present sample did not gain any friendship nominations (an indicator of popularity) as a consequence of their home-language. In other words, as far as home-language is concerned, children were equally likely to receive friendship nominations irrespective of their home-language.

**Non-significant demographic predictors of friendship formation.** Ethnicity (Libyan, coloured and black) and home-language (English, Afrikaans and Xhosa) were non-significant predictors of friendship formation (incoming or outgoing ties) in all three friendship models. In other words, children were sending out similar amounts of friendship ties irrespective of their ethnicity or home language (except for those who had English as a home language, who sent out significantly more friendship ties than children reporting any other home language), while children of different ethnic and linguistic groups were equally popular within this sample.

The impact of ethnic composition within classrooms on peer interactions is not yet fully understood (Howes et al., 2011; Lee et al., 2007), especially in the South African context. However, evidence for significant ethnic homophily effects amongst young children have been previously reported. For example, McCandless and Hoyt (1961) found that children (both Oriental and White ethnic groups) attending a preschool in Hawaii preferred ethnically homophilic friendships. Finkelstein and Haskins (1983) found that ethnic homophily increased over the school year in preschool. Lederberg, Chapin, Rosenblatt, and Vandell (1986) found that Hispanic and Black children preferred ethnically homophilic friendships but White children did not.

The finding of no significant overall ethnic homophily within the present sample could be due to the preschool context. The present preschool has an inclusive multiracial and multicultural composition. Teachers make an effort to present positive views and display positive attitudes towards a variety of cultures and backgrounds (see also Urberg & Kaplan, 1989). Therefore, it is unlikely that parents who object to cross-racial interactions would decide to enrol their child in such a setting (Urberg & Kaplan, 1989). Although the present preschool has a reputation for being ethnically and culturally diverse, results show that the ethnic diversity (Coloured South African 69.5%, Black (African) South African 22%, Libyan 5.1%, White South African 3.3% and Mauritian 1.7%) of the school was relatively low at the time of data collection. In settings where ethnic diversity is low, children have fewer opportunities to create cross ethnic friendships (Lee et al., 2007), and the social networks are then likely (though not guaranteed) to be more homogenous. As a case in point, the ethnic homophily effect for friendship formation was non-significant in the present student in spite of the relatively low ethnic diversity in the school population.

The age groups that were investigated in the present study may offer a plausible explanation for the lack of significant ethnic homophily in the peer friendships amongst these preschool children. There is growing evidence that children display a social bias towards outgroup members by the age of six (Vezzali, Giovannini, & Capozza, 2012) and that ethnic preference seems to intensify with age (Leman et al., 2013). However, the children in the current sample were six years old and younger, and so this social bias towards ingroup members may not have developed yet (they did not exhibit any tendencies for forming friendships on the basis of ethnicity). The preschool period might be a critical period for intervention in order to promote cross-group interactions, because friendships and relationships in early childhood serve as a basis for friendships later on, and may be crucial for laying the

foundation for promoting positive intergroup attitudes at an early age (Fortuin et al., 2014; Vezzali et al., 2012).

Equal status among peers of different ethnic backgrounds invokes optimal conditions for reducing prejudice amongst groups, according to Allport's (1954) intergroup contact theory. This is significant as the intergroup contact theory states that equal status, common goals and co-operation amongst groups, coupled with support from authorities, laws or customs, creates positive contact and reduced prejudice (Pettigrew, Tropp, Wagner, & Christ, 2011; Tomovska, 2010; Vezzali et al., 2012). Research amongst adults has shown consistent positive relationships between intergroup contact and positive attitudes (Pettigrew & Tropp, 2006) but, in comparison, few studies have been conducted with children, especially preschool children (see also McGlothlin & Killen, 2005; Davies, Tropp, Aron, Pettigrew & Wright, 2011). Vezzali et al. (2012) found that children in homogenous schools (i.e., schools with low racial diversity) were more prejudiced than those attending heterogeneous schools (i.e., schools with high levels of diversity; see also Fortuin et al., 2014).

The cross-group friendships found in the present study (as per the ethnic heterogeneity of the social networks observed) are generally built on trust and mutual support, and offer ethnic groups optimal conditions for intergroup contact over an extended time in a variety of settings (Davies et al., 2011; Pettigrew et al., 2011; Vezzali et al., 2012). This has repercussions for future friendships as research has shown that early peer friendships lay the foundations for later friendships (e.g., Lee et al., 2007). Although not tested in the present study, it is possible that the children in the present study could exhibit enhanced interethnic understanding or appreciation (e.g., Lee et al., 2007), which could have positive repercussions in the all subsequent relationships and friendships.

**Propinquity and friendship formation.** The propinquity principle assumes that children are more likely to associate, and become friends with individuals who are available to them (i.e., in the same classroom; Cappella et al., 2012; Gifford-Smith & Brownell, 2003). In addition, Van den Berg and Cillessen (2015) have found that physical proximity leads to liking. During an experiment where participants in a classroom environment were placed closer or adjacent to each other, Van den Berg and Cillessen (2015) found that children placed close or adjacent to each other liked each other more and were more likely to become friends when compared to those children who did not sit close or adjacent to one another. As with the homophily effect, the propinquity effect appears to decrease with age and the proportion of



friends across age groups, school grades, classrooms increases (Gifford-Smith & Brownell, 2003).

Findings reported in the present research reveal that significant effects for creating homophilous ties were found in all four classes (Grade R English and Afrikaans as well as Pre-Grade R English and Afrikaans), confirming hypothesis 1b that there would be a significant preference for forming friendships within classrooms than between classrooms. Children in the Grade R English class were 20 times more likely (compared to children in other classes) to form a friendship with another child in the Grade R English class. Children in the Pre-Grade R English class were just under 7 times more likely (compared to children in other classes) to form a friendship with another child in the Pre-Grade R English class. Children in the Grade R Afrikaans class were almost six times more likely (compared to children in other classes) to form a friendship to another child in the Grade R Afrikaans class. Finally, children in the Pre-Grade R Afrikaans class were just under 2 times more likely (compared to children in other classes) to form a friendship with another child in the Pre-Grade R Afrikaans class. As such, Grade R English was the largest predictor of within class friendship, followed by Pre-Grade R English, Grade R Afrikaans classes and Pre-Grade R Afrikaans. This is consistent with the alter effects, indicating popularity, where all children exhibited a preference for forming ties with children in the English classes (both Grade R and Pre-Grade R classes).

There are two possible explanations for the increased popularity of children in the English classes as compared to children in the Afrikaans classes. Firstly, as highlighted above, almost all the children (even those with Afrikaans as their home-language or classroom-language) were able to communicate (to varying degrees) in English. However, not all the children were able to communicate in Afrikaans. Given the importance of communication in friendship formation (Hoyte et al., 2014), it makes sense that children who could speak the most accessible language in the school may prove to be more popular friendship partners. Secondly, the English classes were also considerably larger compared to the Afrikaans classes (average class size of the English classes was 21 children while the average size of the Afrikaans classes was 8.5 children), offering a wider variety of potential friendship partners (both within and between classes) for children to select from.

It is also important to note that the preference for forming within classroom ties was more pronounced at wave two, nine months after the first wave of data were collected. This suggests that over the duration of this longitudinal study, children became increasingly selective in terms of their friendship nominations (favouring nominees who were in their



classroom). It may well be that friendships within classrooms were reinforced over time by propinquity. This finding is in contrast to that reported by Gifford-Smith and Brownell (2003), who found that propinquity and familiarity are more salient when the school year begins, before children have had an opportunity to gauge the idiosyncratic attitudes and preferences of their peers.

**Comparing propinquity and homophily effects.** Both classroom propinquity and demographic homophily were identified in the present study as significant predictors of friendship formation (incoming and outgoing ties). However, three of the five strongest predictors of friendship formation were associated with classroom propinquity rather than demographic homophily. Moreover, many of the homophily effects observed in the present study (including classroom language and age) could also be explained by propinquity. This could be a function of how the school is organized, where children are grouped into classes according to their preferred language of tuition at school (English or Afrikaans) and age (younger classes: four to five years old; and older classes: five to six years old). Nevertheless, these findings offer compelling support for the relative importance of propinquity in relation to homophily as a predictor of friendship formation amongst preschool children.

### **Promoting Peer Friendships amongst Preschool Children**

As has been highlighted throughout this thesis, children choose their friends strategically and purposefully based on certain demographic and propinquitous properties (Niffenegger & Wilier, 1998; Rekalidou & Petrogiannis, 2012). Moreover, the present study shows, even children as young as four are deliberate in exercising their friendship choices. Nevertheless, and notwithstanding the autonomy of the preschool child to choose their own friendship partners, it is appropriate for teachers to pay attention to the peer networks of children and to facilitate the development of peer friendships amongst preschool children (Hollingsworth & Buysse, 2009). Peer friendships during the preschool period are associated with many benefits for the child, including important mental, emotional and physical advantages (Betts & Stiller, 2013; Poulin & Chan, 2010).

Qualitative interviews undertaken by Hollingsworth and Buysse (2009) reveal that, on the one hand, some teachers believe they have limited influence on friendship development amongst pre-schoolers, and are therefore less likely to engage in practices that promote friendship formation. On the other hand, these interviews reveal that those teachers who do

believe they are facilitating friendship formation do so by merely creating opportunities for playtime amongst the children. Perhaps this highlights the need for educational programmes and learning opportunities for teachers, highlighting the influential role they can play in promoting friendship formation at school, and offering methods they can employ to facilitate and promote friendship formation amongst preschool children (Hollingsworth & Buysse, 2009). Teachers should be made aware of their ‘invisible hand’ (Farmer et al., 2011, p. 247) in the social development of the children in their classrooms, and should be encouraged to employ this invisible hand in a manner that guides the child’s social development through constructive friendship development (Betts & Stiller, 2013; Niffenegger & Wilier, 1998; Van den Berg & Cillessen, 2015).

To this end, other, more deliberate strategies for promoting peer friendships amongst preschool children are required. These could include assigning children specific play partners, demonstrating or role-playing social skills and encouraging friendships through positive comments (Hollingsworth & Buysse, 2009). The success of these strategies relies largely on the creativity and enthusiasm of the teachers, and sufficient structure and organisation within the classroom and the school (Erwin & Letchford 2003; Criss et al., 2009; Rekalidou & Petrogiannis, 2012).

### **Factors that Effect Friendship Stability**

The present study aimed to explore those factors that explain the stability (or instability) of peer friendships amongst preschool children, an area that has remained largely unexplored in the literature to date (Ellis & Zarbatany, 2007; Troutman & Fletcher, 2010). These factors can be grouped into three categories, namely relationship features (i.e., reciprocity and quality of the relationship), individual factors (i.e., external demographic characteristics based on the homophily hypothesis) and those linked to the social context or environment (i.e., the propinquity hypothesis; Poulin & Chan, 2010; Proulx & Poulin, 2013). The results of the present study are discussed along each dimension in turn.

#### **Reciprocity**

Reciprocity is thought to be the simplest form of network processes (Schaefer et al., 2010), and represents a proportion of reciprocated ties to all ties (reciprocated and unreciprocated). Reciprocity is cognitively ‘simple’ as individuals need to identify a positive

interaction and respond similarly (Schaefer et al., 2010). Therefore, evidence for reciprocal friendships amongst children appears in early childhood (Schaefer et al., 2010). Reciprocity of affect is evident in infants; for example when their mothers respond within inappropriate affect to their smiles they tend to become upset, cautious and withdrawn (i.e., mirroring the mothers affect; Fujisawa, Kutsukake, & Hasegawa, 2008; Schaefer et al., 2010). Moreover, by the age of four to five years of age, most children report at least one reciprocal friendship where they engage regularly with a peer they like (Schaefer et al., 2010). As such, it was anticipated for the present study that the preschool children under investigation would be old enough to have developed reciprocal peer friendships.

Reciprocal friendships were hypothesized to be significantly more stable over time than non-reciprocal friendships amongst preschool children (hypothesis 2a). Results showed that the children in the present study exhibited a significant tendency or preference for forming a reciprocal tie (by returning a unidirectional tie). Specifically, children exhibited a greater tendency to form a reciprocal tie relative to a unidirectional tie. Children were also more likely to maintain an existing reciprocal tie than an existing unidirectional tie over the nine-month duration of the present study. These results confirmed the prediction of the present study and replicate what other studies have found, that reciprocal friendships amongst preschool children were significantly more stable over time than non-reciprocal friendships (Quinn & Hennessy, 2010).

Reciprocity tends to vary across the school year (Schaefer et al., 2010). Research has shown that reciprocity should peak when the school year begins, when children establish friendships with a new peers (Schaefer et al., 2010; Walden et al., 1999). As the children begin to sort themselves into friendships and friendship groups, reciprocity effects should begin to show less fluctuation and tend towards remaining constant (Schaefer et al., 2010). Dyad reciprocity remained constant over the nine-month period of the present study (when looking solely at the combined friendship network). This is not to say that all the friendships were maintained over this period of time. Indeed, individual ties (within the network) did shift over time, but the proportion of reciprocated ties remained the same. So, for example, reciprocity amongst best-friends *decreased* over time, while reciprocity in the other friends network *increased* over time. These seemingly contradictory findings could be due to the children becoming more discerning in their selecting best-friends, while they are more open (i.e., generous) to selecting other friends (since the children have become more familiar with the school and have had a chance to get to know the other children in the school). Moreover, this

highlights the importance of studying specific types of friendships (e.g., best friend versus other friend) to generate a more nuanced view of the change in peer friendships amongst preschool children over time.

Reciprocal friendships are generally more stable when compared to non-reciprocal (unidirectional) friendships (Laghi et al., 2014), and the present study confirms this; children were more likely to maintain an existing reciprocal tie over the nine-month duration of the present study when compared to an existing unidirectional tie. In the present study, 89.7% of reciprocated ties were maintained, compared to 48% of the unidirectional ties that were maintained. Amongst best friend dyads, 85.50% of the reciprocal ties were maintained compared to 48% of unidirectional best friend ties over the duration of the study. Similarly, for other friend dyads, 87.50% of the reciprocal other friend ties were maintained compared to a 37% of unidirectional other friend ties over the duration of the study. While the present findings corroborate those reported in the literature (e.g., Dunn, 2004; Howes et al., 1988; Quinn & Hennessy, 2010), the high level of stability in reciprocal ties observed in the present study exceed those of earlier studies that have reported a one-year stability rate of approximately 50% (e.g., Poulin & Chan, 2010). A two-year follow-up study undertaken by Lindsey (2002) suggests that if friendships are not disrupted by a change in classroom arrangements, reciprocal friendships can be maintained over a two-year period.

### **Quality of Friendships**

Research investigating friendships amongst preschool children has rarely separated out best friend dyads from other friend dyads (Quinn & Hennessy, 2010), but, as highlighted above, doing so creates an opportunity for observing nuanced patterns in the maintenance of peer friendships amongst pre-schoolers over time. In the present study, friendship quality (i.e., best friends compared to other friends) was hypothesized to influence the stability of friendship over time, and so children were asked to nominate their best friends as well as any other friends that they had.

While there is research to suggest that young children (ranging from preschool age to approximately eight years of age) are not able to distinguish between best and other friends as readily as older children, this is not to say that children in early childhood do not (or cannot) distinguish between best friends and other friends (e.g., Ladd et al., 1996; Sebanc et al., 2007). Previous research has shown that the best friendships of preschool children are associated with

more positive features (including more compassion, comradery, intimacy, and exclusivity), and are qualitatively different from other friendships in much the same way as is reported by older children (e.g., McChristian et al., 2012; Quinn & Hennessy, 2010; Sebanc et al., 2007).

The present study adopted a relatively novel method for eliciting a distinction between a child's best friend and their other friends at school, by asking children to draw a picture of their best friend at school, and to then report on any other friends they may also have at school. The use of drawings to depict friendships represents an expressive and qualitative method that can be used to access children's mental representation of friendships (Hamama & Ronen, 2009; Sebanc et al., 2007; Woolford et al., 2015). Studies have shown that when using drawing this increases the amount of information that children of all ages report about emotions or events (including friendships; Laghi et al., 2014; Loxton, 2009; Woolford et al., 2015). The present study did not explore what the children thought of their best friends or why they nominated particular peers as their best friend (but see Haw, 2017), and instead attempted to show that preschool children can distinguish between their best friends and their other friends (Sebanc et al., 2007).

As hypothesised, a significantly higher proportion (38%) of best friend ties were maintained over time compared to other friend ties (25%). Therefore, the present study's results supported hypothesis 2b, that friendship quality would be a significant predictor of friendship stability over time insofar as best friend ties would be maintained at a significantly higher rate than other friend ties. These findings concur with those from other studies that have showed that best friends are more stable when compared to other friends (e.g., McChristian et al., 2012; Sebanc et al., 2007; Shin et al., 2014). The present study has extended these findings with the inclusion of such a young sample, as other studies have been conducted using older children or children aged 6 and older.

As I have discussed above, the present study showed that reciprocal friendships were significantly more stable over time than non-reciprocal friendships. However, in both friendship categories, children exhibited a tendency towards dissolving these friendship over time, although this tendency was non-significant. Nevertheless, only 38% of all best friend ties, and 25% of all other friend ties, were maintained over time. These findings not only confirm hypothesis 2b, that a significantly greater proportion of best friend ties will be stable over time when compared to other friend ties, but they also support observations made in the literature that friendships amongst preschool children are fluid or unstable by nature (Proulx & Poulin, 2013; Sebanc, 2003; Shin et al., 2014). While those factors that explain the stability (or

instability) of the peer friendships of preschool children remain under explored, we do know that children choose to form their friendships based on superficial physical characteristics and that sometimes as the relationship becomes deeper these friendships fall away (Ellis & Zarbatany, 2007; Proulx & Poulin, 2013; Troutman & Fletcher, 2010). Moreover, at this young age children's interests and playing styles are also relatively transitory, which further contributes to the instability of friendships amongst this group (Ellis & Zarbatany, 2007; Louw & Louw, 2014).

Pellegrini and Blatchford (2000) suggest that the friendship choices exercised by children are shaped by the characteristics of their classrooms at school (see also Gifford-Smith & Brownell, 2003). Pellegrini and Blatchford (2000) argue that classrooms that are organised in a more traditional manner tend to stifle friendship development, resulting in more children who reporting few to no friends. Traditionally organized preschools resemble a more academic school-style set-up where children would sit alone at a desk facing the front of the classroom. This set-up does not foster friendship development as the focus is on academic learning, where children are grouped according to age, the teacher is the centre of the classroom and children are assigned a seat and passively receive information.

However, in less traditional, more open classrooms (i.e., preschools with a classroom structure similar to the one in the present study) there seem to be more frequent, stable and reciprocal friendships (Gifford-Smith & Brownell, 2003; Pellegrini & Blatchford, 2000). In these classrooms, children can engage in free play with children of all ages, the teacher plays an unobtrusive role in the classroom and children discovers concepts from self-teaching tasks. Thus, one would expect that the non-traditional prosocial classroom characteristics of the present preschool may have positively affected children's opportunities for making and maintaining friendships. While this is true for the formation of friendships in the present study, it does not hold for the stability of friendships over time amongst this sample.

Staff and teachers at the current preschool discourage the use of the term 'best-friend' amongst the children, as they feel this term could serve to leave some children feeling excluded. The staff make the children aware that the children are all friends, but do not have to be best friends or always play with the same friends. This encourages the children to make new friends and be open to including new children into their friendship groups. The staff explain to the children that friends mean everyone needs to get along, be respectful of and look out for each other at school. An example was given where a child might complain that someone "doesn't want to be my friend" then staff would explain to the child that friends can choose whom they

want to play with and that there are many friends to choose from at school. Therefore, at the current preschool, children are still friends, but might choose not to play with that specific friend.

There are two potential consequences of this practise for the interpretation of the current results. First, it may suggest that the number of friends that were nominated could be an overestimation of the true number of peer friendships in this context. Secondly, it is possible that children learning in this environment where every peer should be considered as a friend would be likely to nominate different peers as their friend at each wave of data collection (resulting in apparently unstable friendship networks). Both of these consequences would stem from the somewhat random, ‘scattershot’ nomination of peer friendships amongst the present sample. However, in spite of the School’s policy (and its tendency to promote more random peer nominations), the network density statistics (which were very low at both time points) suggest that children were *not* randomly choosing peers to nominate as friends. If this were the case, then one would have expected a significantly greater density of peer friendships than what was observed. Instead, the pattern of results strongly suggest that the children were making thoughtful, deliberate, and considered peer nominations when requested to do so.

### **Homophily and Propinquity Effects**

The present study replicated and extended results of previous research that shows that homophilous friendships are more stable over time when compared to heterophilous friends. As found in hypothesis 1a, the homophily effect for forming friendships was only significant for gender, age and classroom language. Yet, the endowment function, which measures stability and was tested in hypothesis 2c, indicated that these homophilic ties were not significantly maintained over time.

The endowment function yielded negative results, which means that children in this sample had a tendency to dissolve existing classroom language and age homophilous ties. However, these results were not significant for the same gender effect where children had a non-significant preference to dissolve a homophilic age tie. This could be interpreted as a preference for maintaining a homophilic tie. However, this does not offer any confirmation that there was a significant preference to maintain these ties over time.

In a similar vein, hypothesis 2d predicted that same classroom friendships (i.e., friendships formed on the basis of propinquity) would be significantly more stable over time



compared to cross-classroom friendships. However, the results showed that children in the Grade R Afrikaans and Pre-Grade R Afrikaans and English classes had a significant preference for *dissolving* classroom-homophilous (or propinquitous) ties. Thus, even though children in all four classes had a tendency to establish ties with children in the same class (indicating classroom homophily or the propinquity effect), they did not have a tendency to maintain these ties. Once again, and related to the findings discussed above, these results are consistent with other research that has found preschool children's friendship networks to be relatively unstable or inconsistent (Poulin & Chan, 2010; Proulx & Poulin, 2013).

According to the absolute size of the estimates, the propinquity effects on friendship stability were larger than the absolute size of the homophily effects on friendship stability. However, the impact of both propinquity and homophily on friendship ties was to promote the *dissolving* of friendship ties; in terms of propinquity and homophily, children in this network exhibited a significant preference for dissolving ties over time. As such, although the pattern of results do not strictly support hypothesis 2e, they do still confirm that the effects of propinquity were consistently stronger than the effects of homophily, but on friendship *instability*, not stability (as originally hypothesised), and confirm the relative importance of propinquity versus homophily as a predictor of the outcome of friendship ties.

### **Promoting Stable Peer Friendships amongst Preschool Children**

As with the formation of peer friendships, children choose which friendships they would like to maintain and which friendships they would like to discontinue. Nevertheless, here, too, teachers can exert an important 'invisible' influence on friendship stability. This is important because, while having peer friendships are associated with numerous socio-cognitive and emotional benefits (described previously; Betts & Stiller, 2013; Poulin & Chan, 2010), the ability to maintain friendships over time appear to be essential for the development of prosocial behaviour amongst children (Lindsey, 2002; Proulx & Poulin, 2013; Troutman & Fletcher, 2010). Moreover, a friendship maintained with the same friend (or friendship group) could offer enhanced emotional support to the child when compared to a friendship that is replaced with another child during the year (Proulx & Poulin, 2013).

Although strategies can be put into place to encourage long-term stable friendships among preschool children, peer friendships are more likely to be maintained when they occur in multiple contexts (i.e., in the school environment, neighbourhoods, churches, or reinforced



by familial relations (see Troutman & Fletcher, 2010). This suggests that while friendship formation may be initiated by teachers at school, parents and caregivers have an important role to play in promoting the stability of these friendships beyond the school context. Nevertheless, the findings of the present study do offer some insights as to where teachers might be able to promote friendship stability. The present findings demonstrate that high-quality friendships and reciprocity are two key predictors of friendship stability. Reciprocal friendships can be promoted within the school environment through encouraging children to not dismiss any other child that nominates or identifies them as a friend, and to create opportunities for such children to play together and to assist one another on cooperative tasks. Moreover, high-quality friendships can be encouraged through explaining to children that they can have many best friends and that everyone can be friends. To this end, the friendship policy adopted by the preschool that participated in the present study, which encourages the children to make new friends and be open to including new children into their friendship groups, should be ideal for promoting friendship stability. However, more research is required on those factors that might further enhance friendship stability amongst preschool children (Troutman & Fletcher, 2010) before further definitive recommendations can be made.

### **Limitations**

The present study has made a number of significant contributions towards the study of social networks amongst preschool children. This research adds to the limited literature investigating the predictors of friendship and friendship stability amongst preschool children, both internationally and in the South African context. Furthermore, the data analysis techniques employed in this research further strengthen the findings as every relationship formed, maintained and lost are analysed at once taking all the intricacies into account throughout. Moreover, the present research has substantial social relevance for preschool teachers and parents insofar as it can contribute to the broadening of their understanding of those processes that promote friendship development amongst preschool children. In spite of these contributions, there are two key limitations relating to the present study that deserve mention. These limitations are discussed below in terms of the generalisability of the results and limitations relating to the data analysis methodology.

The first limitation of the present study relates to the generalisability of the findings across samples, preschools, and over time. The relatively small number of children who

participated in the present study come from varying (though not representative) socioeconomic backgrounds and home environments, which could limit the generalizability of the results. Furthermore, the research was undertaken at a single South African preschool, which (with its various, somewhat idiosyncratic policies) may not necessarily be representative of South African preschools nationally. Finally, the development of the peer networks in the present study were only observed for a relatively small window of time (nine months), in spite of the fact that friendships are known to develop and evolve with the rapid social, cognitive, and physical development of the young child.

As such, the results of this study treated with caution. It is possible that these findings do not generalise beyond South African preschool children who participated in this study. Data for 59 children (out of 73 children at wave one and 69 children at wave two students) were used for this analysis. It is unknown to what extent this sample reflects the stability of preschool children's friendships in Stellenbosch in general or South Africa at large, or to what extent there may be self-selection effects present in the data.

The present study employed the advanced technique of social network analysis to explore the social networks of these preschool children over time. Nevertheless, there are four key limitations associated with social network analysis that warrant consideration. Firstly, one of the limitations of social network analysis as a methodological tool is its sensitivity to missing data sampling (Wölfer et al., 2015). There were six children whose parents did not provide consent for their participation in wave two of the present study. As such, the data from these six children were absent within the network, and if these network members were central network members this could have drastically affected the structure of the entire network (see Kossinets, 2006; Wölfer et al., 2015). While there are analytic possibilities for handling missing data in longitudinal social network research, this limitation should be kept in mind when interpreting the social network results (Huisman & Steglich, 2008; Wölfer et al., 2015).

Secondly, although programs like SIENA allow for statistical inferences when studying longitudinal network dynamics, it is not free from limitations based on its underlying assumptions (Wölfer et al., 2015). The Markov assumption assumes that future network states can be determined by previous network states (Wölfer et al., 2015). This excludes certain information as explanatory components for network formation such as the length of time that the two network members were connected. Nevertheless, these limitations can be somewhat overcome through the inclusion of covariate effects that model data that cannot be accounted for (or predicted by) earlier states of a given social network (Wölfer et al., 2015).

Thirdly, research suggests that network members often have structural knowledge deficits relating to their social networks, which poses a challenge to the idea that individuals exert control over the ties in their network and that they have enough information relating to their social networks (Wölfer et al., 2015). If it is true that individuals accumulate information about the relationships of others in their social network, then it is likely that their ‘structural knowledge’ relating to their social network will become increasingly incomplete as the size and complexity of their networks increase (Wölfer et al., 2015). It is difficult to predict the extent of such structural knowledge deficits amongst preschool children, although I would speculate these deficits amongst children aged between four and six years old to be considerable, given their cognitive capacities at that age.

A final limitation with regard to the data analysis technique is that SIENA operates only within binary networks (presence / absence of a network tie) and is unable to model more nuanced dynamics within the social network. In other words, SIENA generates networks that only consider the existence (i.e., coded as a one) or absence (i.e., coded as a zero) of a tie. Even though this limitation restricts the possible research applications, other literature shows that results of valued and non-valued (i.e., binary data) are ultimately comparable (Bauman, Faris, Ennett, Hussong, & Foshee, 2007; Wölfer et al., 2015).

### **Directions for Future Research**

First, future studies should endeavour to test whether the findings of the present study would replicate amongst a similar group of preschool children in a similar preschool setting. This would be especially important in relation to attempting to replicate the findings in the present study relating to the non-significant homophily effects with regards to ethnicity and home-language. A question that remains from the present study relates to *when* (or at what age) do homophily effects for ethnicity in particular become relevant for the peer friendships formed by South African children. Moreover, future studies could address the limited generalizability of the present findings by assessing friendship stability amongst a more diverse sample of preschool children, possibly using more than one preschool setting and drawing comparisons over suitable time points. While using larger (and more representative) samples will assist with improving the generalisability of the results, this should be balanced with the fact that when the size and the complexity of networks increase these networks tend to become less complete

(as network members have insufficient knowledge of all the relationships around them; Wölfer et al., 2015).

Second, with regards to addressing the main methodological limitation in the present study, future studies should endeavour to include data for the entire sample of children. Although this is a considerable methodological challenge, achieving this will enable researchers to get an accurate representation of the friendships in the sample, and will assist them to avoid any drastic impact of missing data associated with central members of the network (Kossinets, 2006; Wölfer et al., 2015).

Third, future research could attempt to compare findings of binary networks (as in the present study) with findings of studies that have used valued network data. For example, future research should study any additional features (i.e., creating valued network data; either behavioural or personality characteristics or attitudes or feelings towards cross-group members) that children consider when form friendships. These considerations could be useful in attempting to understand the factors that predict friendship formation, popularity and friendship maintenance with regards to cross-group friendships (McGlothlin & Killen, 2005).

Fourth, as classrooms seem to be important in predicting friendship formation as well as friendship stability, future research could attempt to experiment with teachers moving children around within their classroom to facilitate and grow different friendships to test whether the invisible hand (Farmer et al., 2011) can in fact facilitate friendships within the South African context. Teachers could essentially have some control over who becomes friends with whom in their classes, which has import implications for minority ethnic groups (Van den Berg & Cillessen, 2015). Teachers are thought to have an invisible hand that theoretically controls whom children interact with depending on where in the classroom a teacher places them and with whom (Schneider et al., 2010; Van den Berg & Cillessen, 2015). An extensively cited study on the stability of children's social networks is a study by Hallinan and Tuma (1978), which asked children to nominate their best-friends, friends and non-friends over time, found that friendship formation and stability was strongly affected by teacher grouping and manipulation of the classroom setting. The notion of the invisible hand (Farmer et al., 2011) is relatively understudied within the literature (Van den Berg & Cillessen, 2015), especially in the South African context where cross-group friendship could play a valuable role in addressing segregation between racial groups.

Relatedly, a fifth direction for future research is to study the effect that the size of the classroom has on friendship formation. This was an area that was not explored in the present study. Cappella and colleagues (2012) found that smaller classrooms are associated with more cohesive social ties, while Johnson et al. (2000) found such smaller classrooms to be less overwhelming for friendship development than larger classroom environments. It would be interesting to explore the extent to which the ‘invisible hand’ (Farmer et al., 2011, p. 247) phenomenon, perhaps in conjunction with class size, might influence the formation and stability of peer friendships amongst preschool children.

A sixth avenue of research for future studies would be to explore the theoretical and qualitative difference between best friendships and other friendships amongst preschool children. This avenue of enquiry has received little attention in the literature on preschool children (Quinn & Hennessy, 2010), and was beyond scope of the present study. Nevertheless, the present study confirms that preschool children can meaningfully distinguish between best friends and other friends, making this a feasible and important line of enquiry for future research.

Lastly, teacher and parent self-report measures of children’s friendships could be used to compare the children’s self-report network to the parents’ or teachers’ representation of their social network. Children’s self-reports rely on children own emotional competencies and knowledge of the social network, and the self-reports of parents or teachers on the children’s social networks could provide a more objective view of the social network of the child. This could overcome the shortcomings that some researchers see as a reason to oppose asking children for their self-reports of their friendship networks. Importantly, it would further validate the importance of social networks amongst preschool children.

## **Conclusion**

This research offers valuable insights that may assist in the development of interventions designed to assist in the social development (or, particularly friendship development) amongst preschool children. These findings suggest that attempts to promote friendships within a preschool environment do not need to be intense or complex. Rather, keeping children of any age, ethnicity or gender in the same class can establish and foster stable relationships/friendships. This offers substantial advantages within post-conflict contexts like South Africa that are characterised by continued segregation and limited intergroup contact,

because preschool settings could be utilised to foster cross-group friendships and promote diversity appreciation at an early age. Attempts to foster friendships at the current preschool environment should be focused on identifying positive relationships or friendships, and keeping those children in the same class or language stream, and thus maintaining friendships. The present study is one of the first South African studies to examine friendship stability in early childhood. The findings reported here can be used to inform the efforts of relevant stakeholders (including teachers, parents, practitioners, and researchers) to design interventions that promote the development of the various social skills that facilitate friendship formation and stability amongst preschool children (Betts & Stiller, 2013). The target levels for these interventions should be child relationships (i.e., to assess to peers), teacher practices (i.e., emotional support to facilitate socio-emotional development) and classroom structures (i.e., small classroom sizes; Cappella et al., 2012). The present study highlights that children in early childhood are indeed able to distinguish their best friends from their other friends in their social network, and that that children as young as four years of age make deliberate friendship choices. I hope that the present research inspires researchers interested in peer friendships in early childhood to listen to the voices of children in early childhood – these young voices are invaluable in furthering our understanding of the development of peer friendships in early childhood.

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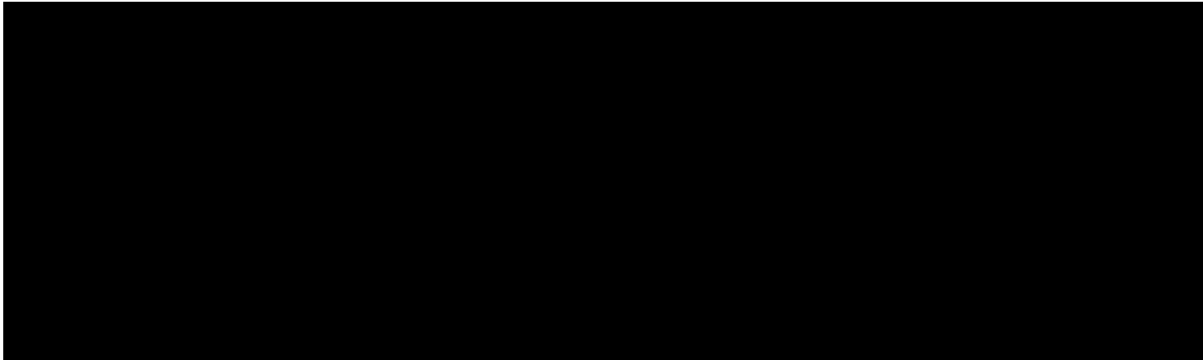
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## Appendix A

### Preliminary Institutional Permission



21 August 2015

Cc Prof. Helene Loxton & Dr Hermann Swart  
Dept. of Psychology  
University of Stellenbosch  
Private Bag X 1  
MATIELAND  
7602

Dear Ms Sarah Gordon

#### **Preliminary permission to conduct research at [REDACTED]**

Thank you very much for the detailed information regarding the new proposed research you are planning to undertake at [REDACTED] that your supervisor, Dr Hermann Swart and co-supervisor, Prof. Helene Loxton, presented to us during our meeting on 6 August 2015.

We understand that your proposed research (Preliminary Title: *Investigating the stability of peer friendships amongst South African preschool children*) will have two dimensions:

- (a) You would like to have access to the archival data collected under supervision of Prof. Helene Loxton in 2015, as part of the Honours Community Interaction Project within the Child Psychology 716 Module;
- (b) You would like to undertake a short follow-up data collection (before the end of 2015) of the above regulated Honours Community Interaction Child Psychology 716 Module project.

We believe that we have been given enough information regarding the two aspects of the proposed research, and that we have gained enough understanding of what this project will entail.

We gladly give permission for you to (a) access the archival data collected under Prof. Loxton's supervision, that you have requested and (b) undertake your follow-up research this year at our school. Furthermore, we undertake to assist in obtaining the appropriate permission from the parents of the children who will be involved, whenever the need arises, on condition that you first

secure the necessary ethical clearance for this proposed research project from the Department of Psychology, as well as the Research Ethics Committee (Humanities) at Stellenbosch University.

Sincerely,

.....

[Redacted]

Coordinator: [Redacted]

CEO: [Redacted]

.....

[Redacted]

School Principal: [Redacted]

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[Redacted]

[Redacted]

[Redacted]

[Redacted]



## Appendix B

### Information Letter to Parents / Guardians



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Dear Parent / Guardian

#### **REQUEST FOR PARTICIPATION IN RESEARCH STUDY ON FRIENDSHIPS AMONGST PRESCHOOLERS**

Research has shown that there is robust empirical evidence for the benefits of friendships during childhood including long-lasting important social, mental, emotional and physical advantages. Therefore, Stellenbosch University is currently conducting research with regard to friendships during early childhood (ages 4 – 6 years old). I, Ms Sarah Gordon, will use this research to inform my proposed Masters study entitled *Investigating the stability of peer friendships amongst preschool children: A longitudinal South African study*.

In addition to this, Ms Philippa Haw, will also use this data to inform her proposed Masters study entitled *Best friend nominations and peer status amongst preschoolers: A South African study*. Together, these two proposed Masters' studies (Ms Sarah Gordon's and Ms Philippa Haw's) are a part of the same broader study.

The broader study will focus on two aspects via the two Masters' theses to investigate the factors that determine preschoolers' best friend nominations and peer status, and to explore the stability of their friendship networks. The information gathered in the proposed research will make a valuable contribution to the current literature base on friendships of young children. Most importantly, it is the first study of its kind to be conducted within the South African context.

This letter is a friendly request to you as a parent or guardian of a child who falls between the age range of 4 to 6 years old, to participate in this research study by (1) allowing the researchers access to archival data collected, under supervision of Prof H. Loxton, earlier in the year as part of the Honours Community Interaction Project, and (2) allowing your child to take part in a short follow up data collection interview (before the end of 2015; only Ms Gordon's project will make use of this follow up data).

Participation of your child will be completely confidential and anonymity is assured. All information that will be used for research purposes will not be traceable to you or your child. The personal information required will only be used for administrative purposes. In the final results of this study the only aspects that will be reported on will be demographical data such as the age, gender and ethnicity of the child.

If you have any concerns about your child's behaviour during the course of the project, arrangements can be made for consultation with the supervisor, Prof. Loxton, a registered Counselling Psychologist ([hsl@sun.ac.za](mailto:hsl@sun.ac.za)).

**If you agree to have your child participate in this study, it will be appreciated if you would please complete the form entitled STELLENBOSCH UNIVERSITY CONSENT TO PARTICIPATE IN RESEARCH, attached to this letter and return it in the enclosed envelope marked for the attention of Ms Sarah Gordon and Ms Philippa Haw.**

For any further information regarding the research, you are welcome to contact the researchers or the supervisors. You can also contact the Research Ethics Committee: Human Research (Humaniora) at the University of Stellenbosch if you have further concerns or complaints that were not adequately addressed by the researcher.

You will receive a copy of this information and consent form for your own records.

Thank you for your time.

Yours sincerely

**Ms Sarah Gordon**

MA Psychology student

University of Stellenbosch

[18653758@sun.ac.za](mailto:18653758@sun.ac.za)

**Supervisor: Dr H. Swart**

Department of Psychology

University of Stellenbosch

Private Bag x 1

Matieland

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7602

**Co-Supervisor: Prof. H. Loxton**

Department of Psychology

University of Stellenbosch

Private Bag x 1

Matieland

South Africa

7602

**DETAILS OF PARENT / GUARDIAN: INDICATION OF PARTICIPATION**

|  |  |
|--|--|
| <b>Name of parent / guardian (full name in capital letters):</b> |  |
| <b>Mother / father / caregiver:</b>                              |  |
| <b>Name of your child:</b>                                       |  |

Please mark the appropriate options:

|  |  |
|--|--|
| <b>I agree to participate in this research study.</b>        |  |
| <b>I do not agree to participate in this research study.</b> |  |

|                  |  |
|------------------|--|
| <b>Signature</b> |  |
| <b>Date:</b>     |  |

## Appendix C

### Parent's Informed Consent Form



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### STELLENBOSCH UNIVERSITY

### CONSENT TO PARTICIPATE IN RESEARCH

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#### FOR PARENTS / GUARDIANS

You are asked to participate in a research study conducted by Stellenbosch University with regard to friendships during early childhood (ages 4 – 6 years old). This research will inform the following two Masters' studies:

**Ms Philippa Haw**, proposed study entitled *Best friend nominations and peer status amongst preschoolers: A South African study*; and

**Ms Sarah Gordon**, proposed study entitled *Investigating the stability of peer friendships amongst preschool children: A longitudinal South African study*.

The students are BA Psychology (Hons) graduates, currently enrolled as MA (Psychology) students, at the Department of Psychology of Stellenbosch University. You were selected as a participant in this study given that (1) your child falls between the age group of 4 to 6 years old, and (2) attends [REDACTED] in Stellenbosch, where the research will be conducted.

#### 1. PURPOSE OF THE STUDY

The purpose of the research study is to explore friendships in early childhood in a sample of young South African children (aged 4 – 6 years old) by means of individual interviews. The proposed study seeks to expand the current literature base on friendships in young children. Most importantly, it is the first study of its kind to be conducted within the South African context. The social relevance of this research is based on the future contributions this research can make in understanding the processes that underlie the complex development of friendships amongst preschool children. Furthermore, it serves as base line data for future projects and/or interventions.

#### 2. PROCEDURES

Should you consent to participate in this research study, you will be asked to complete this form and **please return it to** [REDACTED] **2015.**

### **3. POTENTIAL RISKS AND DISCOMFORTS**

No physical risks or discomfort are likely to occur in the study.

### **4. POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY**

Firstly, the proposed study aims to fill a gap in South African literature with regard to friendship development in a sample of young South African children.

Secondly, one aspect of this proposed research aims to identify and understand those factors that determine preschoolers' nominations as a best friend, and to assess whether there are any distinguishing characteristics among preschoolers receiving more peer nominations compared to those receiving fewer peer nominations. A study identifying the personal and situational factors that facilitate preschool friendships is thought to have substantial developmental value as friendships are suggested to play a significant role in individuals' cognitive, social and emotional development. To date, no studies have investigated these factors within a South African context. Findings of this research may support the development of interventions designed to cultivate in preschoolers those characteristics found to be attractive to peers, thus enhancing peer liking, promoting interaction, and supporting friendship development within a South African context. Furthermore, insight into the situational factors that predict peer liking may assist South African educators in being more knowledgeable of and promoting preschoolers' friendships.

Thirdly, a second aspect of this proposed research aims to understand the stability of peer friendships (social networks) amongst a sample of South African preschool children. Until recently, researchers have concentrated their efforts on exploring various characteristics of preschool friendships, including the number of friends a child has and the quality of these friendships. More often than not, these studies have not taken the temporal dimension of friendship into account. When this temporal dimension is taken into consideration, the transient nature of friendships emerge. The process of maintaining or terminating a friendship amongst preschoolers does not appear to be random. However, relatively little is known about the exact factors that explain the volatility or instability of friendship networks amongst children. This study is the first of its kind within the South African context and the findings from this study will make a valuable contribution to understanding and explaining friendships amongst preschool children.

### **5. PAYMENT FOR PARTICIPATION**

Participants will not receive payment for participation in this study.

### **6. CONFIDENTIALITY**

Any information that is obtained in connection with this study and that can be identified with you or your child will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by means of the following: soft copies of the data will be stored on a password secured computer; hard copies of the data will be locked away into filing cabinets and only the researchers and the supervisors will have access to the data. The child will remain anonymous and his / her information will remain confidential. The only aspects that will be reported on will be demographic data such as the age, gender and ethnicity of the child, in the final reporting of the results.

Upon request, teachers and parents / guardians will be provided with specific feedback.

Should the research be published, participants' information will stay fully confidential and anonymous.

## 7. PARTICIPATION AND WITHDRAWAL

You can choose whether to participate in this study or not. If you volunteer to participate in this study, you may withdraw at any time without consequences of any kind. The researcher may withdraw you from the research if circumstances arise which warrant doing so.

## 8. IDENTIFICATION OF RESEARCHER

If you have any questions or concerns about the research, please feel free to contact:

|                                    |           |                                    |
|------------------------------------|-----------|------------------------------------|
| Sarah Gordon ( <b>Researcher</b> ) | <b>OR</b> | Philippa Haw ( <b>Researcher</b> ) |
| Email: 18653758@sun.ac.za          |           | Email: 16551974@sun.ac.za          |

|                                    |  |
|------------------------------------|--|
| Dr. H. Swart ( <b>Supervisor</b> ) | Prof. H. Loxton ( <b>Co-Supervisor</b> ) |
| Department of Psychology           | Department of Psychology                 |
| University of Stellenbosch         | University of Stellenbosch               |
| Private Bag x 1                    | Private Bag x 1                          |
| Matieland                          | Matieland                                |
| South Africa                       | South Africa                             |
| 7602                               | 7602                                     |
| Email: hswart@sun.ac.za            | Email: hsl@sun.ac.za                     |

## 9. RIGHTS OF PARTICIPANTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study.

**If you have any questions regarding your rights as a participant**, you are welcome to contact **Ms Maléne Fouché (mfouche@sun.ac.za; 021 808 4622)** at the Division of Research Development, US.

**PLEASE TEAROFF THIS PAGE AND RETURN IN THE ENVELOPE WITH  
THE INFORMATION LETTER**

**Name of child:** \_\_\_\_\_

**Who completed the questionnaire: Mother / Father / Guardian?**

**Gender of guardian: Male / Female?**

|                                 |
|---------------------------------|
| <b>SIGNATURE OF PARTICIPANT</b> |
|---------------------------------|

The information above was supplied to me by **Sarah Gordon** and **Philippa Haw** in English and I am in command of the language.

I, the participant, understand that if I need to ask questions, I need to contact the researchers, and my questions will be answered to my satisfaction.

I hereby consent to participate in this study. I have been given a copy of this form.

\_\_\_\_\_  
**Name and Surname**

**Participant (Parent / Guardian)**

\_\_\_\_\_  
**Signature of Participant**

\_\_\_\_\_  
**Date**

|                                |
|--------------------------------|
| <b>SIGNATURE OF RESEARCHER</b> |
|--------------------------------|

I declare that I supplied the information given in this document to \_\_\_\_\_ [*name of the participant*].

\_\_\_\_\_  
**Signature of Investigator**

\_\_\_\_\_  
**Date**



## Appendix D

### Research Ethics Committee (Humanities): Ethics Clearance



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jou kennisvennoot • your knowledge partner

#### Approval Notice

##### Stipulated documents/requirements

05-Nov-2015

Swart, Hermann H

**Proposal #: SU-HSD-001725**

**Title: Peer friendships amongst pre-school children: Longitudinal stability and qualitative characteristics**

Dear Dr. Hermann Swart,

Your **Stipulated documents/requirements** received on , was reviewed and has been **accepted**.

Please note the following information about your approved research proposal:

**Proposal Approval Period:** 02-Nov-2015 - 01-Nov-2016

#### **General comments:**

Please take note of the general Investigator Responsibilities attached to this letter.

**If the research deviates significantly from the undertaking that was made in the original application for research ethics clearance to the REC and/or alters the risk/benefit profile of the study, the researcher must undertake to notify the REC of these changes.**

Please remember to use your **proposal number (SU-HSD-001725)** on any documents or correspondence with the REC concerning your research proposal.

Please note that the REC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki and the Guidelines for Ethical Research: Principles Structures and Processes 2015 (Department of Health). Annually a number of projects may be selected randomly for an external audit.

National Health Research Ethics Committee (NHREC) registration number REC-050411-032.

We wish you the best as you conduct your research.

If you have any questions or need further help, please contact the REC office at 218089183.

Sincerely,

Clarissa Graham  
REC Coordinator

Research Ethics Committee: Human Research (Humanities)

## Appendix E

### Child Psychology 716: Honours Community Interaction Project Questionnaire

#### Child Psychology 716: Practical Project Questionnaire 2015

Student: \_\_\_\_\_ Student no: \_\_\_\_\_ Date: \_\_\_\_\_ Time slot: \_\_\_\_\_

Name of child: \_\_\_\_\_ Gender: \_\_\_\_\_ Language: \_\_\_\_\_

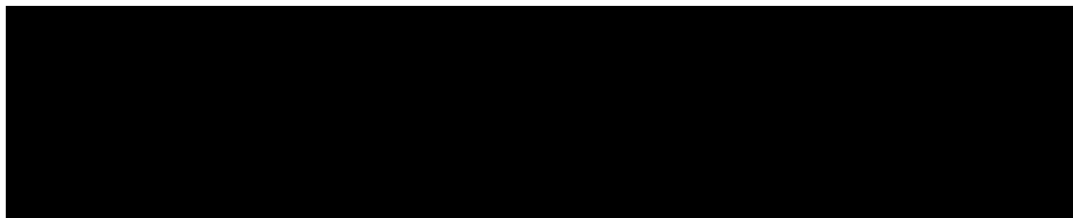
Child Psychology 716 Supervising Lecturer: Prof Helene Loxton; e-mail: [hsl@sun.ac.za](mailto:hsl@sun.ac.za)

|  |
|--|
| 1. Do you have a best friend? / Het jy 'n beste maatjie?   |
| 2. Who is your best friend? / Wie is jou beste maatjie?<br><br>Would you like to make a drawing of your best friend? Here are some crayons and paper /<br>Wil jy graag 'n tekening van jou beste maatjie maak? Hier is kryte en papier.<br>2.1 What is your best friend's (point at drawing) name / Wat is jou beste maatjie (wys na die tekening ) se naam?<br>2.2 Is your best friend at [ ]? (If not, elaborate) / Is jou beste maatjie by [ ]? (indien nie, brei uit)<br>2.3 Do you know how old your best friend is? / Weet jy hoe oud jou beste maatjie is?<br>2.4 Is your best friend a boy or a girl? / Is jou beste maatjie 'n seuntjie of 'n dogtertjie? |
| 3. 1. Why is X your best friend / Hoekom is X jou beste maatjie? 3. 2. Why do you like X so much? / Hoekom hou jy so baie van X?<br>(Please indicate (circle) which option worked better /dui asb aan (omsirkel) watter opsie het die beste gewerk)  |
| 4. Do you have other friends? / Het jy nog ander maatjies?   |
| 5. How many other friends do you have? / Hoeveel ander maatjies het jy?  |
| 6. What are their names? / Wat is hulle name?  |
| 7. Tell me more about your friends – what kind of games do you like to play? / Vertel my meer van jou maatjies – van watter speletjies hou julle?  |
| 8. Story that you like best: Who told it? / Where did you hear it?<br><br>Storie waarvan jy die meeste hou: Wie het dit vertel? / Waar het jy dit gehoor?  |

General remarks / Algemene opmerkings

## Appendix F

### Student Confidentiality Form to be signed for Child Psychology 716: Honours Community Interaction Project (Practical Work; English)



#### APPLICATION FOR RESEARCH, PRACTICAL WORK OR OBSERVATION AT [REDACTED]

*This form has to be completed by anyone wishing to visit [REDACTED] for educational purposes*

#### **DETAILS OF THE STUDENT / VISITOR**

|   |  |             |  |
|---|--|-------------|--|
| Full names and surname:                   |  |             |  |
| ID Number:                                |  |             |  |
| Residential Address:                      |  |             |  |
| Postal Address:                           |  |             |  |
| Telephone:                                |  | Cell phone: |  |
| Current field of study or name of course: |  |             |  |
| Study year:                               |  |             |  |
| At which organisation:                    |  |             |  |
| Period of time spent at [REDACTED]:       |  |             |  |
| Aim of visit:                             |  |             |  |

#### **CONTACT DETAILS OF THE STUDENT'S / VISITOR'S LECTURER, STUDY LEADER, SUPERVISOR OR EMPLOYER:**

|                          |  |  |  |
|--------------------------|--|--|--|
| Title, name and surname: |  |  |  |
| Contact Number:          |  |  |  |
| Contact Address:         |  |  |  |
| Contact e-mail:          |  |  |  |

#### **CONFIDENTIALITY:**

|  |  |                    |
|--|--|--------------------|
| Herewith I   |  | (name and surname) |
| undertake to adhere to the educational programme, routine and guidelines of the staff at [REDACTED], |  |                    |
| without disturbing the activities of the children during my visit. I understand that young preschool |  |                    |
| children are open-hearted and naïve, and often talk about themselves, and I undertake to act with    |  |                    |
| discretion and shall regard all information as confidential. I undertake to regard this visit as an  |  |                    |
| opportunity of learning and to utilise any information for study purposes only.                      |  |                    |
|  |  |                    |
| Signature of student   |  | Date               |
|  |  |                    |
| Signature of [REDACTED] Vice Principal   |  | Date               |